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QUEENSLAND AGRICULTURAL JOURNAL

VOL. IX.

JANUARY, 1918.

PART I.

Agriculture.

THE PROFITS OF COTTON-GROWING.

Mr. Daniel Jones, who is one of the oldest cotton-growers in the State, writing to the *Brisbane Courier* of 28th November, on the returns received for the crop of 1917, said:—

“ If the returns appear dazzling, they do not reach what was won out of the black soils in the Ipswich districts fifty years ago. Neither have the prices paid equalled that which growers have realised for some varieties of cotton grown in the North during the past fifteen years.* *Re* cost of tillage, that has been reiterated by me until tired of doing it. Suffice it to say that anyone who elects to farm, and who cannot grow a crop of cotton to harvest for $\frac{1}{2}$ d. per lb., and pick it for another $\frac{3}{4}$ d., had better not engage in farm pursuits. I have always urged that this vocation is a family one; hence no labour question comes into the arena.

“ Cotton needs handling much as dairying, save that in the case of cotton it is not the drudgery, making, as a witness averred before the Interstate Commissioner lately, white slaves of the family. In my inquiries, growers state that 100 lb. to 150 lb. of fibre can be picked in a day.† This, at $\frac{3}{4}$ d. per lb., whether it be juvenile or adult labour, means a fair wage.

* This was not Uplands; but the valuable Caravonica cotton evolved by Dr. Thomatis at Cairns.

† Until we can evolve a cotton which will, like wheat or maize, mature the bolls all at the same time, the first and last pickings will be comparatively small; but in the height of the season pickers can, in a day of eight hours, pick from 100 lb. and even up to 200 lb.—Editor, “Q.A.J.”

" If the cotton industry were dependent on child labour, I would roundly condemn it. Cost of tillage and picking should not exceed £5 per acre; the balance is profit. In the instances quoted, the lowest return was for 2 acres, £10 17s. 1d. (an untilled plot); the highest, £24.

" In scrub areas cotton can be sown after a burn for 15s. an acre, as in most districts, during the first season, the undergrowth does not show, and no tillage is required. On forest areas 30s. an acre is sufficient to win a crop. This, with picking added, indicates the costs and profit, basing the price on last season's crop—viz., 3-58d. per lb.

" I have watched a picker gather 58 lb. of fibre in two hours. A smart hand, allowing an average of 1,000 lb. per acre, should control up to 12 to 14 acres without help in the season—about six months' work."

COTTON NOTES.

GIN HISTORY.

Under this caption B. L. Leach, in "Cotton and Cotton Oil News," Texas, U.S.A., 13th August, 1917, discusses the cost and returns of cotton-gin plants in localities where cotton is a mere "fill-in" crop, and states that it has been proved that they have been unprofitable investments from the fact that probably less than 25 per cent. of the plants so located are operated at a profit, operation being based on an average of years.

The variation of the cotton acreage from year to year, where diversified farming is the rule, is a problem which the ginowner cannot consistently combat.

This condition, or uncertainty of cotton acreage, is wholly responsible for the much too keen competition in the ginning industry.

It is unqualifiedly repeated that competition is the "life" of trade, but when applied to the ginning business in diversified farming regions, competition has proven to be the "death" of trade. This statement can be easily verified by a look around at the numerous idle gin plants which were constructed during the years of large cotton acreages, by persons foreign to the actual conditions.

The keen competition which now exists, coupled with the rapid deterioration of gin plants, the uncertainty of acreage, excessive insurance protection, the elevated prices of all necessities in connection with the operation of the gin, and the very short period of operation, constitute a condition which, in the end, will mean still greater financial losses to the ginning business unless the present prevailing charge for ginning cotton is materially increased.

The present charge ($\frac{1}{4}$ d. per lb.) for ginning and wrapping a bale of cotton is to the ginner as 7 cents per lb. is to the producer. The farmer can not afford to produce cotton for 7 cents per lb., and the ginner cannot continue in business and gin for 50 cents per 100.

The producer expects the ginner to begin operation at the time the "first bale" arrives, which, as a general rule, is the latter part of August, and as cotton-picking is not general before the latter part of September, the gin is operated the first month in the season at a considerable loss. This is also true of the last month of the season.

When we take into consideration that there are only three months in the year (October, November, and December) during which time the ginner can expect to operate at a profit, it is plain to be seen why gin plants, as a whole, are losing investments.

The cotton-producer expects the ginner to equip his gin with the latest machinery, keep the plant in the best of repair, and gin the cotton with as little delay as possible. He has a right to demand as much; yet, in exacting the best service, the farmer should not object to the ginner charging a price for that service that will afford him a legitimate profit on the investment.

The average gin plant represents an investment of approximately 8,000 dollars.* Eight or nine months of the year the plant is idle.

The average life of the gin is probably less than ten years, depending somewhat upon the conditions under which it is operated. Depreciation, therefore, is a very important factor and one that is not given the necessary consideration by many operators. Interest on the investment, taxes, and insurance are other very important fixed expenses, and the four fixed charges just mentioned are perpetual in their accumulation regardless of whether the plant is operated or standing idle.

The above expenses may be properly termed "incidental," since their accumulation is certain and must be provided for, even though the plant is not operated.

Let us now reduce these expenses to actual "experience" figures in order to more easily grasp their importance: Assuming the average gin plant to represent a valuation of 8,000 dollars we find the incidental expenses to be—

	Dollars.
Depreciation, at 10 per cent. per year	800
Interest, at 10 per cent. per year	800
Insurance, at 3 per cent. per year	240
Taxes, at 2 per cent. per year	160
Total incidental expenses	2,000

Again repeating, for the sake of emphasis, the ginner must provide for the above charge of 2,000 dollars regardless of whether or not he operates or allows his gin to stand idle.

We will now discuss, for sake of comparison, the source of the ginner's anticipated income.

The average ginner, in the locality under discussion, will probably gin in a season approximately 1,000 bales, yet the majority do not reach this figure.

	Dollars.
Received for ginning, 1,000 bales of cotton, average weight, 500 lb.	4,000
Less cost of bagging and ties, at 1 dollar 25 cents (1917 prices)	1,250
Gross profit from gin	2,750
300 tons seed purchased; average net profit 2 dollars ton	600
Total gross income for season	3,350

* To convert dollars into British currency roughly, divide the figures given by 5.

OPERATING EXPENSES.

	Dollars.
Manager's salary for year	1,200
Clerical and labour	1,000
Fuel, oils, &c.	750
Stationery and advertising	300
Repairs and general expense	300
Total operating expenses	3,350

While the above figures are estimated, yet they are based on actual experience. The fact which we wish to prove by them is that a gin will not pay more than actual operating expenses from ginning 1,000 bales of cotton.

The amount of seed handled by a gin will vary materially from year to year, depending on the market price and competition from street buyers, yet the net profit of 2 dollars per ton is approximately correct unless the ginner speculates in cotton-seed, in which event he will be in the hands of chance.

We believe the figures above will stand up under the assault of the severest critic; yet we are open for any concrete proof to the contrary.

COTTON AND MAIZE IN THE ROMA DISTRICT.

Our illustration shows a fine field of Russell's Big Boll Cotton, grown in November, 1916, by Mr. E. A. Thomas, of Llanellay, Orallo, Roma district, from seed supplied by the Department of Agriculture and Stock.

The second photograph shows a portion of a field of maize grown by Mr. Thomas, near Euthulla, along the proposed line to Injune Creek. The variety is Early Yellow Dent, the seed of which was also obtained from the Department.

"ONCE-OVER" TILLER.
PRACTICAL DEMONSTRATION.

At Miramar, Wellington, lately, a practical demonstration was given of the latest American invention in farm machinery. The "once-over" tiller, the invention in question, is manufactured in Minneapolis, and the machine exhibited was imported by Messrs. Hope Gibbons Sons and J. B. Clarkson, Ltd. The machine is quite a new affair, and was only seen in England for the first time in July last. At the demonstration there was quite a representative gathering. His Excellency the Governor-General and the Countess of Liverpool were present, as also were the Minister of Finance (Sir Joseph Ward), the Minister of Agriculture (the Hon. W. D. S. MacDonald), and representatives of leading business firms in touch with farmers, engineers, experienced farmers, and practical ploughmen.

The principle on which the "once-over" works is simple. It is a rotary tiller, and consists of a standard American sulky plough, horse-driven, and with a seat provided for the ploughman. Alongside the ploughshare is a vertical pulveriser—that is, a number of knives after the style of a sausage-mincer. As the plough turns up the soil it falls against the rotating knives which pulverise it. The pulveriser is worked by a motor machine, and the horses have merely to draw the plough along. For this new machine it is claimed that its operations are the equivalent of ploughing, cultivating, and harrowing the land in one operation. The pulveriser was hampered by the sods on grass land, but on stubble land it did excellent work. Sir Joseph Ward acted as ploughman for once round the paddock, and was filmed by the Picture Supplies Company.

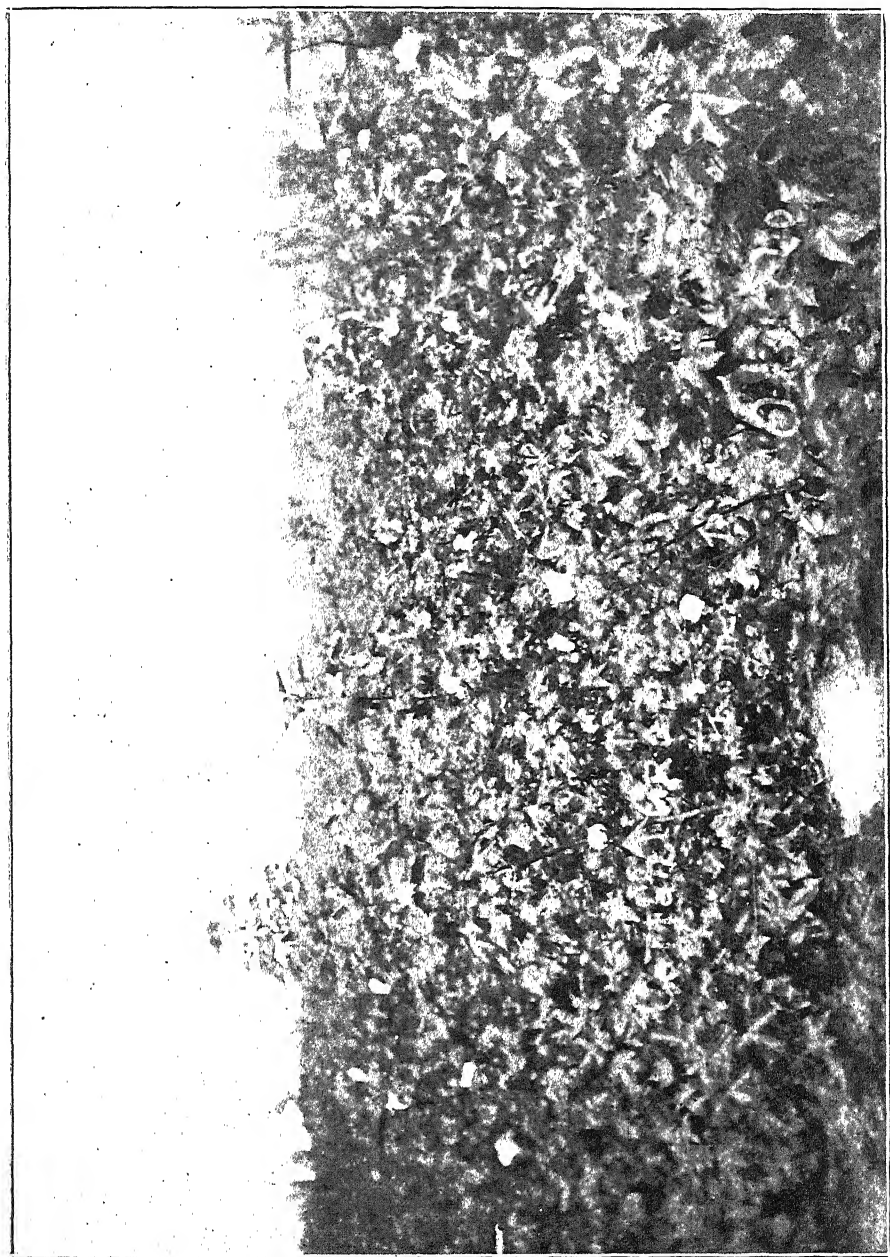


PLATE I.—COTTON GROWN BY MR. ERNEST A. THOMAS AT ORALLO, ROMA DISTRICT.



ONION-GROWING IN NORTH QUEENSLAND.

We have received from Mrs. McDermott, Kinhora, St. Helens, which is situated half-way between Mackay and Proserpine, a sample, here illustrated, of a very fine onion, which appears to be of the same variety which was grown in large quantities at Oxley Creek in the sixties from seed imported from Spain by Mr. Martindale. At that time onions were worth from £60 to £80 per ton. This specimen weighed 1 lb. 5 oz. It would be interesting to know what the returns were per acre.

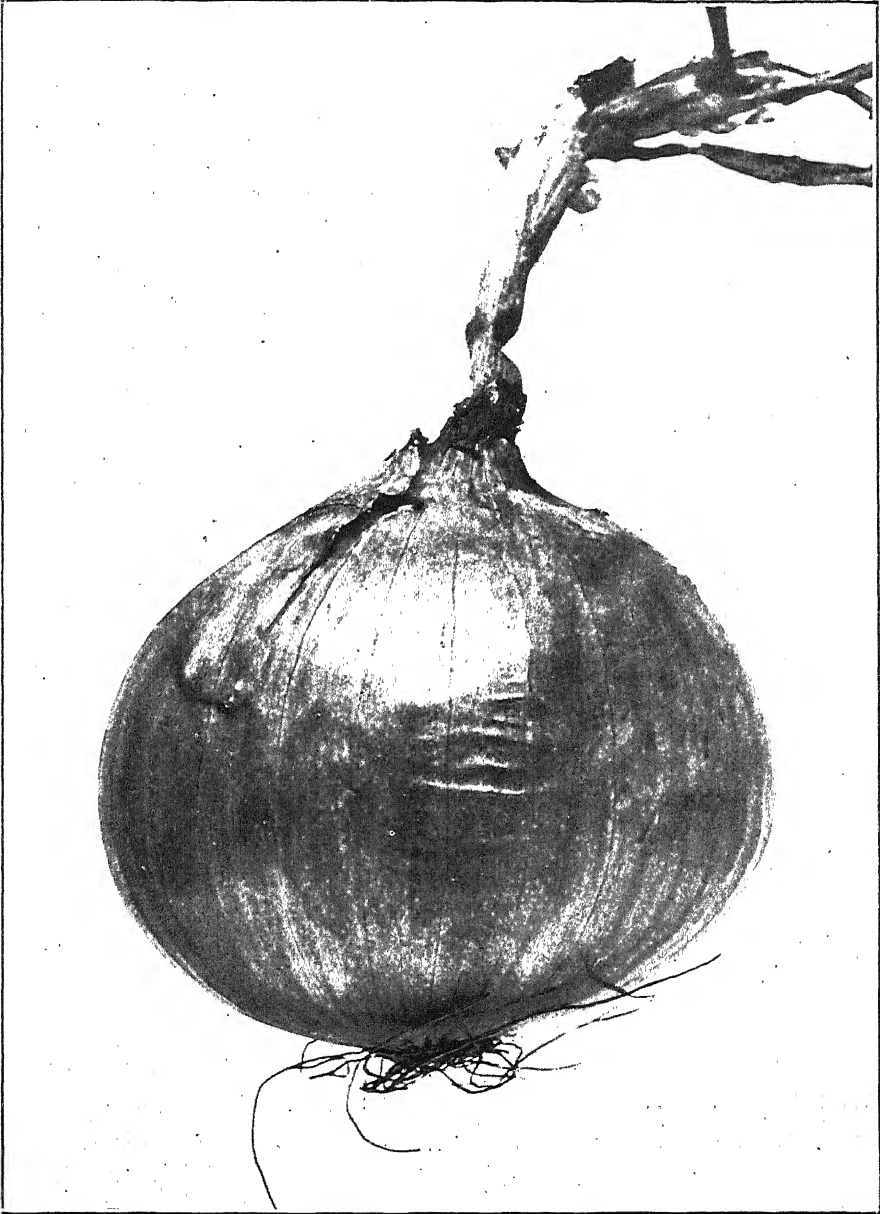


PLATE 3.—ONION GROWN BY MRS. McDERMOTT, KINHORA, ST. HELENS,
NEAR MACKAY. WEIGHT, 1 LB. 5 OZ.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
F. C. G. Gratton ..	"Towleston," Kings-thorpe	2	14	Holstein Cattle Club Herd Book
T. Mullen	"Norwood," Chelmer	3	20	Queensland Jersey Herd Book
J. H. Paten	Yandina	6	21	Ayrshire Herd Book of Queensland
Queensland Agricultural College	Gatton	4	38	Ayrshire Herd Book of Queensland
		2	2	Ayrshire Herd Book of Scotland
		2	9	Holstein-Friesian Herd Book of Australia
		2	31	Jersey Herd Book of Queensland
J. W. Paten	Wanora, Ipswich ..	10	42	Ayrshire Herd Book of Queensland
M. W. Doyle	Moggill	4	12	Queensland Jersey Herd Book
G. A. Buss	Bundaberg	1	15	Herd Book of the Jersey Cattle Society of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Milking Shorthorn Herd Book of Queensland
M. F. and R. C. Ramsay	Talgai, Clifton ..	5	27	Herd Book of the Jersey Cattle Society of Queensland
George Newman ..	Wyreema	9	37	Holstein-Friesian Herd Book of Australia
R. Conochie	Brooklands, Tingoor	9	21	Queensland Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
W. J. Barnes	Cedar Grove ..	10	37	Queensland Jersey Herd Book
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
W. J. Affleck	Grasmere, N. Pine ..	6	31	Queensland Jersey Herd Book
A. J. McConnel	Dugandan, Boonah	19	36	Australian Hereford Herd Book
A. Pickels	Blackland's Stud Farm, Wondai	4	62	Illawarra Dairy Cattle Herd Book of Queensland
G. C. Clark	East Talgai, Ellinthorp	3	7	New Zealand Herd Book
H. D. B. Cox	Sydney (entered brother's name)	3	16	Commonwealth Standard Jersey Herd Book
J. T. Perrett and Son	Coolabunia	2	36	Illawarra Herd Book of Queensland
State Farm	Kairi	4	8	Ayrshire Herd Book of Queensland
		1	2	Holstein-Friesian Herd Book of Australia
		45	127	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	1	12	Illawarra Herd Book of Queensland
W. F. Savage	Ramsay	50	400	Australian Hereford Herd Book
Tindal and Son	Gunyan, Inglewood	3	28	Queensland Jersey Herd Book
J. N. Waugh and Son	Prairie Lawn, Nobby	9	55	Ayrshire Herd Book of Queensland
J. H. Fairfax	Marinya, Cambooya (2)	25	100	Queensland Shorthorn Herd Book
C. E. McDougall	Lyndhurst Stud, Warwick (2)	6	20	Ayrshire Herd Book of Queensland
J. Holmes	"Longlands," Pittsworth	1	20	Illawarra Dairy Cattle Association
P. Biddles	Home Park, Netherby	1	9	Milking Shorthorn Herd Book
A. Rodgers	Torran's Vale, Lane-field	1	..	Holstein-Friesian Herd Book of Queensland
R. S. Alexander	Glenlomond Farm, Coolumboola	2	..	Holstein-Friesian Herd Book of Australia
State Farm	Warren	3	83	Ayrshire Herd Book of Queensland
S. H. Hosking.. ..	Toogooloowah ..	2	15	Holstein Cattle Club Herd Book
W. J. H. Austin	Hadleigh Jersey Herd, Boonah	1	2	Queensland Jersey Herd Book
Ditto	ditto .. ..	..	6	Commonwealth Standard Herd Book
H. M. Hart	Glen Heath Stud, Yalangur	7	21	Ayrshire Herd Book of Queensland
C. Behrendorff	Inavale Stud Farm, Boonah	3	9	Holstein-Friesian Herd Book of Queensland
F. A. Stimpson	Ayrshire Stud Farm, Fairfield, South Brisbane	25	77	Ayrshire Herd Book of Queensland
M. L. Cochrane	Paringa Farm, near Cairns	5	21	Ayrshire Herd Book of Australia

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
Albert Cook	"Greenmount," Mackay	1	8	A.-A. Stud Book, New Zealand
Thomas Brown	"Bellgrove," Kingaroy	1	14	Do.
Higgins Bros.	Sandy Creek, Leslie, Q.	6	2	Do.
Calcino Bros.	"Summariva," Charleville	3	4	Do.
W. M. McKelvie	"Undulla," Miles ..	5	4	Do.
James Connors	"Glen Erin," Nanango	1	2	Do.
J. A. Mackintosh	"Yundah," Warwick	2	8	Do.
M. J. Luff	Kaimkillenbun	1	1	Do.
A. Spencer	Brisbane	2	1	Do.
Beak Pastoral Co.	Rockhampton	2	10	Do.

TO CONSTRUCT A WIRE BRIDGE.

"Osmiridium," writing to the "Papuan Courier," describes a method of building a wire bridge across a stream which, he says, combines many advantages over the old-fashioned plan, such as was some years ago thrown over the crossing of the North Pine River. His plan is cheaper, less wire is used, and anyone handy with tools can erect it. Also, the person using it would have no balancing to do, as he would simply be a "plumb-bob" under the wire. Following is the specification of material required for the bridge:—

Wire bridge for span of 100 ft.: Main $\frac{5}{8}$ -in. wire rope to rest on "pig-stye" at each end and then go on to anchor frames at lower level than the bridge wire. Cage to be 4 ft. long, 2 ft. 6 in. wide, and 3 ft. deep, made of light timber and hardwood frame, set in two slings of either wire chain or iron, and suspended from hooks on two wheeled runner blocks on main wire. Cage to be operated by a small windlass fixed in cage to iron plummets and the side of cage. Line for hauling cage across to be an endless $\frac{1}{4}$ -in. wire rope running through 3-in. pulley-blocks at level of main wire and spragged at one end. The bottom end of endless wire takes two or three turns around windlass barrel in cage, and cage will work across on turning windlass handle. Hooks on traveller blocks should be of steel, and tested to half a ton. Main wire can be strained either with union screws or Spanish windlass on to anchor frames. Weight: 200 ft. $\frac{5}{8}$ -in. steel wire rope, allowing a working strain of 3 tons, 120 lb.; endless rope for hauling cage, 200 ft., 20 lb.; two 3-in. pulley-blocks, 10 lb.; travelling blocks, 15 lb.; cage (estimated), 75 lb.; total weight material, if Spanish windlass used, 240 lb. If 200-ft. span required only 80 lb. extra weight would be necessary. Travelling blocks require two hooks (safety) on which to suspend cage, and they want to be 2 ft. apart from centre to prevent cage twisting.

Such a bridge would be very handy in flood times in Queensland, where travellers are often stuck up for days on the banks of a billabong owing to the depth and rush of water at the usual crossing-places, not to speak of the dangers of attempting to cross when big snags are being carried along the streams.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH OCTOBER TO 26TH NOVEMBER, 1917.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%.	Lb.	
Sweet Meadows ...	Jersey ...	8 Aug., 1917	599	6.3	44.73	
Iron Plate ...	" ...	14 Oct. "	889	4.1	42.82	
Nina ...	Shorthorn ...	6 Sept. "	968	3.7	41.96	
Auntie's Lass ...	Ayrshire ...	5 July "	965	3.6	40.71	
College Damsel ...	Holstein ...	12 July "	956	3.6	40.33	
Lady Melba ...	" ...	14 Feb. "	836	3.9	38.26	
Lillia ...	Ayrshire ...	11 July "	749	4.2	36.97	
Hedge's Dutchmaid	Holstein ...	9 Sept. "	926	3.4	36.80	
Miss Bell ...	Jersey ...	27 June "	599	5.2	36.79	
Violette's Peer's Girl	" ...	26 Oct. "	589	5.1	35.47	
Netherton Belle ...	Ayrshire ...	17 July "	730	4.0	34.28	
College Bluebell ...	Jersey ...	28 June "	730	4.0	34.28	
Lady Dorset ...	Ayrshire ...	14 Aug. "	782	3.7	33.89	
Lady Annette ...	" ...	19 Oct. "	711	4.0	33.39	
Burlesque ...	Jersey ...	8 Oct. "	518	5.4	33.07	
Netherhall Queen	Ayrshire ...	30 June "	865	3.2	32.28	
Kate						
Princess Kate ...	" ...	28 June "	663	4.1	31.92	
Thornton Fairetta	Jersey ...	30 June "	512	5.2	31.45	
Songstress ...	Ayrshire ...	1 Oct. "	684	3.9	31.29	
Miss Betty ...	Jersey ...	27 Mar. "	556	4.7	30.80	
Lady Loch II.	Ayrshire ...	3 June "	698	3.7	30.25	
La Hurette Hope	Jersey ...	22 Aug. "	538	4.7	29.81	
Prim ...	Holstein ...	3 Aug. "	883	2.9	29.77	
Rosine ...	Ayrshire ...	21 June "	632	4.0	29.68	
Buttercup ...	Shorthorn ...	2 June "	753	3.3	29.01	
Skylark ...	Ayrshire ...	24 May "	598	4.1	28.80	
Confidence ...	" ...	25 June "	682	3.6	28.76	
College Mermaid ...	Jersey ...	21 Aug. "	456	5.3	28.54	
Lady Mitchell ...	Holstein ...	26 Sept. "	743	3.0	25.93	
Leonie ...	Ayrshire ...	4 Sept. "	597	3.7	25.88	
Snowflake ...	Shorthorn ...	17 May "	509	4.2	25.13	
Miss Edition ...	Jersey ...	25 Dec., 1916	540	3.9	24.71	
Miss Security ...	Ayrshire ...	27 Mar., 1917	551	3.8	24.54	
Windhill Davidina	" ...	2 July "	568	3.4	22.56	
Hedge's Madge ...	Holstein ...	22 Mar. "	488	3.9	22.32	

GOATS AND THEIR MANAGEMENT.

We have been asked by a correspondent to continue the subject of goat-keeping, which has already been dealt with in several issues of the Journal. The limits of this Journal will not permit of a very lengthy article on the matter, but the following are the main features of the business as laid down by H. S. Holmes-Pegler in an exhaustive article on the subject, published last year in "Live Stock on the Farm," edited by Professor C. Bryner Jones, M. Sc., F.H.A.S., London:—

SELECTION OF A BREED.

If utility is the one object apart from appearance, the Swiss (Toggenburg and Saanen) are to be preferred, also the Anglo-Swiss, which is a cross between the best breeds as regards quantity of milk. The next best cross to this would be the Anglo-Nubian-Swiss, which means further crossing with goats having "milking blood" in their veins, being generally that of animals which have made themselves conspicuous at shows as milkers. If price is an important matter, or appearance, the Anglo-Nubian will answer the purpose well. The chief merit of Swiss goats is the large quantity of milk they almost invariably yield.

CONDITIONS SUITABLE FOR GOAT-KEEPING.

The chief recommendation for goat-keeping is the facility with which goats may be accommodated, whilst the same benefits are derived, in a small way, as those obtained from dairy stock on the larger scale. In the first place, pasturage, though an advantage in some cases, is by no means necessary, and, unless it be extensive, is an absolute disadvantage, for goats kept long on this same grass without a change of herbage, in time, contract disease and die off. The goat, indeed, in spite of its propensity to roam, accommodates itself readily to the stall-feeding system, and, given the run of a yard, will often do better stall-fed than one that is pastured. In many instances, goats are kept to advantage without even this yard; but a garden is almost a *sine quâ non* if this animal is to be maintained economically. Hence, a mere shed—if nothing better is available—and a vegetable garden will enable anyone to keep a goat or a couple; and it is advisable to have two, for various reasons. In the first place, the supply of milk for a household can be continued for a longer period, providing that the two come into profit at different times; and secondly, they do better in company, being sociable animals, whilst the trouble of feeding and milking is not much more for two than for one.

THE GOAT HOUSE.

Although a mere shed is mentioned as sufficient in an emergency to start with, most people prefer to build a proper goat house. Any disused stable or cow house or some outbuilding, with very little arrangement of the interior, can be adapted to the wants of a goat. A needful accommodation is a raised bench, 3 feet long by 2 feet wide, which can be used for the goat to lie on, or on which it may stand to be milked. The latter is most necessary.

Goats have a dislike to damp in any form, and will always prefer a plain board or two, at a short elevation from the floor, to the most inviting bed of straw or other litter on the ground. A hay-rack is the next necessity, and here two important points should be observed. Goats are wasteful creatures in their food if they have facilities given them for being so, and they can destroy as much hay as a pony will eat if the hay-rack is not suitably constructed to counteract this. With this object, the bars of the rack must be placed $1\frac{1}{2}$ inch apart, and the rack itself should be raised to such a height from the ground that the animal has to stand on its hind legs to reach the contents.

STABLES.

A loose box in a well-ventilated stable, where sunshine can enter, especially if a horse is kept under the same roof, makes capital accommodation. Goats like company, and will generally fraternise with other animals, especially horses and cows.

FEEDING AND CARE OF GOATS.

Goats are not always the hardy animals that they are popularly supposed to be, and this is greatly on account of the way they are fed. Like other stock, or, indeed, human beings, the more highly they are fed the more liable they are to disease.

GARDEN PRODUCE AS FOOD.

Goats are capable of utilising and transferring into splendid milk a quantity of material which would, in most cases, be wasted. Garden produce is here chiefly referred to, although the kitchen can also furnish some portion of the ration, such as dried crusts of bread and peelings of vegetables, or even remnants of porridge and cooked potatoes.

Amongst the garden refuse are potatoes and pea haulms, the latter being stored and given dry, also clippings of trees at pruning time. Grass may be given, but it must be absolutely fresh, and must not be trampled on. Soiled grass no goat will touch—they will almost starve first. The tops or leaves of vegetable like carrots, parsnips, Jerusalem artichokes, and many weeds such as thistles, brambles, &c., are always acceptable. Goats are very fond of barking trees, and fresh-cut branches of suitable trees may be thrown into the yard.

For dry food, a moderate quantity of hay and corn should form part of the daily ration to maintain the milk supply. Oats should be preferred to maize, as the latter is not so digestible as the former, and is too heating. The guiding principle in feeding goats to get a good yield of milk is to give as great a change as possible. As these animals chew the cud, they require to have as much as is necessary to fill the stomach, and then to be left quiet for a time to masticate and digest it.

When goats are stall-fed, they should be fed four times a day, beginning at 7 in the morning, continuing at 11 and 4 p.m., and at 7 or 8 in the evening.

Goats rarely drink water except in very hot, dry weather. It should, however, be offered them twice a day when stall-fed. The water must be absolutely fresh, and given in a perfectly clean bucket. Salt is a necessary adjunct to food. Goats delight in licking a lump of rock salt.

COST OF FEEDING A GOAT.

In England, the cost of feeding a goat when supplies have to be bought is reckoned by the writer at 2½d. per day, or at 2d. a day where there is a garden. The cost would, to some not very great extent, be higher in Queensland if everything in the way of food had to be bought; but the vegetable garden here, producing all the year round, would keep expenses down.

AGE FOR MATING.

Goats breed at a very early age. Good stock is often begotten by kids of six or seven months old; but it is better to wait for a year before mating.

MILKING A GOAT.

A goat should be milked twice a day at least after the kids are weaned. Regularity in the hours of milking is of great importance, for if a goat is milked at all hours, it is detrimental to the supply. Feed a goat when milking her. It keeps her attention fixed on her food instead of on the process that she is being subjected to, and she stands quieter in consequence. Milk her on a raised bench.

YIELDS OF MILK.

"What quantity of milk does a goat yield?" is a very common question. I may, on this point, take occasion to mention that it is not wise to accept as gospel all the statements that are made by goat-keepers, especially when a goat is offered for sale. In correspondence with an American on this point, I ventured to express the opinion on the statement that a certain goat in America was reputed to yield 6 quarts a day, which I regard as impossible for any goat to give. I suggested that possibly the quart in America was a smaller measure than that in England. To this, the American replied:—"It is true our quarts are not as large as your quarts, but we have the same-sized liars."

The ordinary supply from a common goat in full profit is from 2 to 3 pints a day—occasionally 4 pints. But numbers of goats in England have given over 1 gallon a day. In all show records weight and not measurement of milk is given, as the latter is deceptive on account of froth which can make a pint and a-half look like a quart when first drawn. Take, however, the following equivalents:—One gallon of milk is equal, roughly, to 10 lb.; therefore, 2 quarts will equal 5 lb.; 1 quart, 2½ lb.; and 1 pint, 1½ lb. or 20 oz. This is actually the weight of water, whilst the specific gravity of milk is a fraction more, but 10 lb. is near enough for the purpose. Several goats in England gave from 8 lb. 4 oz. to 12 lb. 3 oz. per day; and one goat, "Leazes Eve," fifteen weeks after the birth of her kids, gave nearly half a ton of milk.

PROFIT IN GOAT-KEEPING.

Although the demand for goats is enormous in England, that for goat's milk is practically nil; consequently, until there is such a demand, goat-farming can never pay as a matter of business. But for household purposes there is much profit.

An ordinary goat will yield milk, on an average, for the first three months she is in profit at the rate of 3 pints daily, and during the next three about half this quantity; whilst in the last quarter she will only supply ½ pint daily. This brings the total to 240 quarts. The value of this, at 4d. per quart (in England), is £4. If a Toggenburg Swiss, or the right kind of Anglo-Nubian be kept, however, the yield for the first quarter should be at the rate of 2 quarts daily; for the second, 3 pints; and for the third (though it may extend to another month), 1½ pint, giving a total of 384 quarts, which, at the same valuation, would be worth £6 8s. This is putting it at the lowest price for cow's milk—4d. per quart; but goat's milk is really worth 6d. per quart. The value of the milk of three goats, the number required to maintain enough milk for a household all the year round—two being common goats, and the third a superior animal—would be £14 8s.; and the cost of their keep should not be more than £9.

In addition to the actual monetary value of the return in milk, something has to be said for the advantage from a health-giving and economic point of view. Where there is a family of young children, the blessing of a good home supply of milk is inestimable.

REARING KIDS.

When the milk supply of a goat is much required for household use, it is doubtful whether it pays to rear her kids. As regards the males, it certainly does not, and even the females only when the dam is an exceptional milker. If one considers the value of the milk consumed by one of their youngsters by the time it is weaned, it will be found to have cost something like 16s. The kids may be weaned in about six weeks. For the first three days, it is well to let the kids suck in order to have the benefit of the "biesting," or first milk, which is especially adapted to the wants of

the newly-born, whilst unsuitable for domestic consumption. After this, it is better to milk the goat regularly and completely, and to feed the kids with it from a bottle, than to let the latter remain by the side of their dam, taking what milk they like until the time comes for weaning them. This system is practised on dairy farms with cows, and what applies with advantage to the larger animal is equally applicable to the smaller.

Previous articles on the "Milch Goat" appeared in the issues of this Journal for July and September, 1915, and January and June, 1916.

Mr. Mahoney, of the Queensland Department of Agriculture and Stock, who has kept milch goats for a long time, commenting on the foregoing, says that, of course, much of the matter contained in the article is not applicable to Queensland. Maize, he argues, is too heating. As to the cost of feeding, he puts it at 10s. per head per month in normal times. In this country bran, prime lucerne chaff, and crushed linseed meal form the main feed, a handful of oats being given at times. On the question of mating, he advises to wait for eighteen months. As to the yield of milk, his experience with a mongrel-bred goat has been that it gave $1\frac{1}{2}$ quarts a day after being in milk for 16 months. It all depends on the feeding. The fodders mentioned by the writer of the English article, he does not consider of any value, as bran and lucerne are not included by the former. The goat abovementioned returned a value of about £12 in milk in twelve months.

HOW TO TIN IRON UTENSILS.

Some time ago we received a letter from a subscriber asking how to tin iron utensils. We were unable to answer the question. In the "Town and Country Journal" of 21st November, 1917, we find the following instructions:—

"If the article is an old one, it must be put on the fire and allowed to get nearly red hot, which will get rid of all the grease. Then make a pickle of the following proportions:—Oil of vitriol, $\frac{1}{2}$ lb.; muriatic acid, $\frac{1}{2}$ lb.; water, 1 gallon. If the saucepan can be filled, so much the better; if not, keep the pickle flowing over it for, say, five minutes. Pour out, rinse with water, and scour well with sand or cork dust with a wisp of tow. Rinse well with water. If the pan is clean, it will be of a uniform grey colour, but if there are any red and black spots it must be pickled and scoured again till thoroughly cleaned. Have ready chloride of zinc, that is muriatic acid, in which some sheet zinc has been dissolved, some powdered sal ammoniac, some tow, about 18 inches of iron rod of about $\frac{1}{2}$ inch or $\frac{3}{4}$ inch thick (one end flattened out and bent up a little and filed clean), and some bar tin. Dip a wisp of tow in the chloride of zinc, then into the powdered sal ammoniac, taking up a good quantity and rub well all over, the inside; this must be done directly after the scouring, for if allowed to stand it will oxidise. Put on the fire till hot enough to melt the tin, the end of the bar being brushed over the heated part till melted. Run down about half the bar, and with the flat end of the iron rod rub the tin well over the surface, taking care not to heat too large a surface at once, nor to let it get too hot; which may be known by the tin getting discoloured, when some dry sal ammoniac must be thrown in. Having gone all over it, wipe lightly with a wisp of tow, made just warm enough that the tin does not stick to it. When cold, scour well with sand and tow, rinsing with plenty of water."

LUCERNE "DON'TS."

Professor Coburn in his "Book of Alfalfa," gives the following advice to lucerne-growers:—

"Don't sow any nurse crop. Don't sow in freshly-ploughed land, no matter how carefully prepared. Don't let weeds or grass grow over 6 inches high without mowing. Don't mow when the crop is wet with rain or dew. Don't let lucerne stand; if turning yellow, cut it. Don't sow old seed. Don't sow less than 20 lb. per acre, half each way. Don't pasture it. Don't let any water stand on it. Don't try to cut for hay until the lucerne takes the field. Don't let it go to a thin stand, but disc in more seed; don't be afraid you will kill it. Don't replough the land—disc it. Don't sow on land not well under-drained. Don't leave your land rough; use a roller to level and smooth it.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, NOVEMBER, 1917.

Broodies have been again exceedingly prevalent during the month of November. During the last week, 33 birds of the heavy breeds were placed in the broody coops. C. Knoblauch, A. H. Padman, and G. Williams have had 3 each out of their pens for broodiness in the light breed section. The weather has been very much against egg-production, the ground being saturated owing to the abnormal rainfall, which has been a great discomfort to the birds. Even with the adverse weather conditions, the health of the birds has been splendid. The total number of eggs laid during the month was 8,313. G. Chester and Kelvin Poultry Farm are equal for highest number of eggs laid in the light breeds with 141 eggs each; while R. Burns takes the first place in heavy breeds with 143 eggs. The following are the individual records:—

Competitors.	Breed.	Nov.	Total.
LIGHT BREEDS.			
E. Chester	White Leghorns	139	1,086
G. Chester	Do.	141	967
*G. H. Turner	Do.	120	958
F. W. Leney	Do.	128	942
*J. M. Manson	Do.	138	941
W. Becker	Do.	121	936
Oakland Poultry Farm	Do.	136	925
W. R. Crust	Do.	127	933
Chas. Porter	Do.	97	909
Kelvin Poultry Farm	Do.	141	909
T. A. Pettigrove, Victoria	Do.	114	896
T. Taylor	Do.	123	884
Moritz Bros., S.A.	Do.	117	883
*J. Zahl	Do.	122	880
*A. T. Coomber	Do.	135	874
*J. R. Wilson	Do.	125	869
Quinn's Post Poultry Farm	Do.	109	854
D. Fulton	Do.	122	854
A. Shillig	Do.	117	852
*Mrs. J. R. D. Munro	Do.	119	835
J. G. Richter	Do.	94	825
A. H. Padman,	Do.	113	825
T. B. Hawkins	Do.	104	820
*Dixie Egg Plant	Do.	131	819
*T. Fanning	Do.	126	805
J. L. Newton	Do.	131	803
Mars Poultry Farm	Do.	108	800
*A. W. Bailey	Do.	105	791
Mrs. W. D. Bradburne, N.S.W.	Do.	121	777
R. Holmes	Do.	109	776
F. Clayton, N.S.W.	Do.	112	775
C. Knoblauch	Do.	69	768
G. Howard	Do.	107	760
J. Holmes	Do.	122	758
L. G. Innes	Do.	106	757
Mrs. S. J. Sear	Do.	121	754
E. Cross	Do.	115	749
G. J. White	Do.	114	747
S. C. Chapman	Brown Leghorns...	118	744
C. P. Buchanan	White Leghorns...	133	741
C. H. Singer	Do.	128	739
G. Williams	Do.	98	738

*Indicates that the birds are engaged in the single hen test.

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Nov.	Total.
LIGHT BREEDS— <i>continued.</i>			
*A. E. Walters	Do.	118	734
J. Ferguson	Do.	122	722
E. A. Smith	Do.	112	713
Miss M. Hinze	Do.	112	703
*C. C. Dennis	Do.	102	699
Mrs. J. Carruthers	Do.	100	688
*Dr. E. C. Jennings	Do.	115	660
HEAVY BREEDS.			
*R. Burns	Black Orpingtons	143	1,027
*Mars Poultry Farm	Do.	129	945
W. Smith	Do.	153	941
A. E. Walters	Do.	103	917
W. S. Hanson, N.S.W.	Do.	106	861
*E. F. Dennis	Do.	106	857
F. A. Claussen	Rhode Island Reds	105	841
Mrs. J. H. Jobling, N.S.W.	Black Orpingtons	115	797
*E. A. Smith	Do.	139	785
D. Kenway, N.S.W.	Do.	103	773
Cowan Bros., N.S.W.	Do.	87	772
P. C. McDonnell, N.S.W.	Do.	98	769
H. Jobling, N.S.W.	Do.	114	768
*Miss M. Hinze	Do.	131	718
*Oakland Poultry Farm	Do.	96	717
King and Watson, N.S.W.	Do.	95	715
C. B. Bertelsmeier, S.A.	Do.	108	708
R. Burns	S. L. Wyandottes	107	684
E. Morris	Black Orpingtons	93	680
J. M. Manson	Do.	103	668
*Kelvin Poultry Farm	Plymouth Rocks	84	641
C. C. Dennis	White Wyandottes	98	641
F. Clayton, N.S.W.	Rhode Island Reds	57	575
*F. W. Leney	Do.	90	574
Totals ... ..	...	8,313	58,540

* Indicates that the birds are engaged in the single hen test.

DETAILS OF SINGLE HEN TESTS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
G. H. Turner	144	144	174	173	149	174	958
J. M. Manson	163	161	134	152	154	177	941
J. Zahl	169	110	174	100	179	148	880
A. T. Coomber	152	91	169	155	151	156	874
J. R. Wilson	161	143	141	158	121	143	869
Mrs. Munro	181	129	120	131	110	164	835
Dixie Egg Plant	133	159	155	160	154	58	810
T. Fanning	107	141	151	137	118	151	805
A. W. Bailey	36	137	158	158	153	149	791
A. E. Walters	104	107	119	144	131	129	734
C. C. Dennis	137	89	68	129	135	141	699
Dr. E. C. Jennings	78	81	123	125	151	102	660

EGG-LAYING COMPETITION—continued.
DETAILS OF SINGLE HEN TESTS—continued.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
HEAVY BREEDS.							
R. Burns	146	133	194	142	192	230	1,027
Mars Poultry Farm	146	178	149	161	162	149	945
E. F. Dennis	167	153	154	180	167	38	857
E. A. Smith	139	128	90	162	137	129	785
Miss M. Hinze	134	114	102	125	128	115	718
Oaklands Poultry Farm... ..	168	103	97	87	166	96	717
Kelvin Poultry Farm	96	100	103	155	74	113	641
F. W. Leney	98	106	73	88	113	96	574

Apiculture.

TO PREVENT BEES SWARMING.

From one of our South African exchanges, we take the following plan which corroborates the advice given by one of our Queensland successful apiarists:—

“ Before danger of swarming begins, take an empty hive-body, and into this put all comb (with adhering bees) from colony to be worked, with the exception of one comb, preferably one with least brood. This comb (with the queen) is left in the old hive, which is filled with frames with full foundation, and excluder placed over frames. Bees and comb in other hive-body are placed above excluder, after careful examination has been made to make sure that no queen-cells are present, and a frame with full foundation inserted in vacant space. Beginners may note that under the least sense of isolation, in a hive for the queen, queen-cells will be built, and in this case, with full excluder between, queen-cells will in all probability be built in this upper story. A week after manipulation, examination for queen-cells should be made, and if found must be destroyed.

“And in this way does the bee need guidance more than in the matter of swarming. Our South African bees swarm at the least excuse, often apparently with no excuse; and just now, when the veldt, in many parts, shows a blaze of bloom, early swarming may be a trouble.

“Bad as our South African bees are in the matter of swarming, the instinct can almost entirely be bred out by tactfully worked swarm prevention carried out season after season, and—a most important point—by breeding from colonies which have shown little inclination to swarm. This has been proved. The result is well worth the trouble entailed.”

PROSPECTS OF THE RICE INDUSTRY.

In the December issue of the Journal, in an article on Rice Culture, we mentioned Papua as a probable market for Queensland-grown rice. This prospect is confirmed by the following note and Government notices in the “Papuan Courier” of 5th October, 1917:—

Government Stores, Port Moresby,
18th September, 1917.

Tenders are invited and will be received at this office until noon on the 24th day of December, 1917, for the supply of 120 tons of “Undermilled” or “Unpolished,” Siam rice.

2. The contract to cover a period of twelve months as from the first day of February, 1918.

4. A sample (weighing not less than 2 lb.) of the rice proposed to be supplied to accompany the tender.

Tenders are invited and will be received at this office until noon on the 24th day of December, 1917, for the supply of 240 tons No. 1 Siam Rice.

[It should be noted that rice is grown at one place only in the Territory—at the Catholic Mission on Yule Island—for local consumption.—Ed. “Q.A.J.”]

The Orchard.

OLIVE-GROWING.

It can hardly be said that the olive has been grown commercially in Australia (says a Sydney paper). The most considerable plantations that have come under notice are at the Wagga Experiment Farm and at Minchinbury Vineyards, Rooty Hill. In either instance the area all told probably does not amount to more than 2 or 3 acres. Still, the trees have been shown to bear freely of a good class of fruit under such widely differing conditions as in the typical strong red soil of the wheat districts at Wagga, chocolate volcanic soil at Minchinbury, and the poor sandy soil at Hawkesbury Agricultural College. One of the effects of the war is to prompt a regret that the olive has not been more extensively cultivated. One has to find out how prices have advanced to an unprecedented level. This is due to the cutting off of supplies from France, Italy, and Spain, upon which the market formerly was chiefly dependent. Before the year is out the shortage is likely to become more acute.

As far as the Commonwealth is concerned South Australia is practically the only producing State, and the product is favourably known on this side.

The area devoted to olives in South Australia only totals about 1,000 acres. This includes young and bearing trees, and the annual production of oil has averaged in the vicinity of 15,000 gallons. The manufacturers in the Central State have this year paid £13 per ton for olives, which is the highest price ever known in Australia. [The cost of picking is also high, the rate this year being £6 per ton, or as much as was paid for the berries in the earlier days of the industry.]

Professor Perkins, the South Australian Director of Agriculture, is a strong advocate of the extension of olive-growing. In his own State he considers the area of olive groves could, with perfect safety, be extended to 15,000 or 20,000 acres, especially in the light rainfall farming districts in which the soil is adequately provided with lime. He has, for instance, arranged to plant 520 acres on one of the Government farms in the form of shelter-belts and windbreaks, consisting of four rows of trees, 40 ft. apart, surrounding each paddock.

State measures, Professor Perkins is satisfied, are essential to the development of the olive oil industry, and suggests that the Government should undertake that in any new district in which olive-planting is done on an appreciable scale the fruit, when available, would be taken over at full market rates for crushing in State factories, if the facilities provided by private enterprise should prove to be inadequate. Further, in districts in which the plantations happened to be distant from State or private factories, he is of the opinion that special railway concessions should be given in respect to the carriage of ripe olives. He also suggests that the Government should offer to new planters a yearly bonus of 10s. or 20s. an acre planted, until the trees attain their tenth year. Professor Perkins emphasises the desirableness of systematic planting of olive groves under State control, and indicates that such a scheme, in conjunction with private enterprise, would carry in its train a number of advantages, including the provision of employment, in times of need, for those out of work, the reduction to a minimum, in the planted areas, of applications for drought relief; that it would afford employment on a large scale for returned soldiers; and, finally, assist materially to promote closer settlement.

The Queensland climate and soil are said to be better adaptable for the cultivation of this useful olive fruit than either South Australia or New South Wales, and it has been proved beyond doubt that the olive thrives exceptionally well, even to great perfection, in various places in Queensland. (Olive oil made at the Penal Establishment at St. Helena, Queensland, readily sold at 10s. per gallon wholesale.—Ed.) And why it has received so little attention in this State is somewhat hard to understand. But that is no reason why its cultivation should be neglected so lamentably in the future. It would be a good scheme for the Government to give the olive business serious consideration by selecting a suitable place for its growth and placing a batch of returned soldiers on a few acres of land for the purpose. A lot worse can be done by the Government than this; it would prove the commercial value of the olive and probably be the means of creating a new industry for this State.

A recent discussion in the columns of a Sydney daily paper on the cultivation of the olive has drawn some exceedingly interesting information from Mr. Leo Buring, manager of the Minchinbury Vineyards,



PLATE 4.—OLIVE TREES AT WESTBROOK.

Rooty Hill, where the olive has flourished for many years. Mr. Buring has had practical experience in all phases of olive-growing, olive-marketing, olive-pickling, and olive-drying. He is not greatly impressed with the prospect for olive-growing for oil extraction in New South Wales, owing to the labour difficulties; but, nevertheless, he is a confirmed believer in the food value of the olive. Accordingly, he contends that the olive should be planted by everybody who has room for a few trees, and he expresses the hope that what has been said in this column will stir up sufficient interest to induce the planting of this useful tree to a greater extent than has so far been the case in New South Wales.

It is, he says, essentially a tree that should be grown on small holdings, as under existing conditions it would never pay to plant out large areas, the cost of gathering except by child and woman labour being prohibitive. The introduction of legislation which prevents children

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It is, he says, essentially a tree that should be grown on small holdings, as under existing conditions it would never pay to plant out large areas, the cost of gathering except by child and woman labour being prohibitive. The introduction of legislation which prevents children

from remaining away from school during any part of the year to carry out such work as gathering of olives does away with any chance of picking this fruit economically. Such legislation, no doubt, was aimed chiefly at stopping truancy amongst city children, but it has prevented country children from earning money by doing work which would not only be healthy, but also be the means of creating an industry that would be of immense value to the country, and no doubt the increased consumption of the oil would also benefit the general health of the community. But that by the way. Taking one season with another, he says, and stripping the olives by hand on to bagging or tarpaulins spread under the tree, an average of 1 cwt. per picker per day is all that can be gathered. He has had children and women do this, but when men have been put on the cost of picking alone in normal times amounted to £10 a ton, or more than the fruit is worth. Once the cost of picking is more than £4 per ton, there is, Mr. Buring says, no profit in growing olives (just now the price of oil is abnormal owing to the war). It was for this reason that after planting out 5 acres at Minchinbury most of the trees were taken up and sold, and only an avenue of trees in bearing remains.

Mr. Buring holds the view that with the numerous poultry-yards throughout the State—and particularly in the county of Cumberland, every producer should plant these trees, as they give splendid shelter, and the ripe fruit as it falls is largely devoured by the fowls, and the oil and mineral acids the fruit contains act as a medicine for the poultry. There is, in his experience, no more useful tree for this purpose. Again, he advises every person who has a plot of ground planted with fruit trees for home use to find room for an olive. He recommends the Verdale in preference to any other. The Verdale will grow in all extremes of climate, equally well on the coast as inland, at sea level or elevations up to 4,000 and 5,000 ft.: it will resist a temperature of 20 degrees below freezing-point. Its only drawback is that it does not yield a high percentage of oil in comparison with the weight of fruit.

Many people are fond of pickled olives, says Mr. Buring, and many more would acquire the taste with the opportunity. The curing of olives, he points out, is very easily done, and no variety lends itself better to this purpose than the Verdale. To obtain the best value with olives they should be cured when they contain a fair percentage of oil. The Verdale grows to a nice size, and when nearly ripe its colour is light green. It is not so bitter as other varieties, so does not require in the curing so severe lye as other sorts. Further, it is freestone, and when cured ripe does not go mushy or mouldy like most other varieties. When bottled, it has a nice appearance, and its flavour surpasses the Spanish olive beyond description.

The olive is generally considered to take many years before coming into bearing. Mr. Buring points out that if its growth is stimulated by artificial manuring and watering, it will bear four years after planting out. The Verdale does not grow into such a large tree as other varieties, so in an orchard does not require more room than other fruit trees. Besides pickling, olives can also be dried, and, as the oil does not evaporate, the dried olive retains its full feeding value. The method is to allow the olive to become fully ripe, then cut off the twigs bearing the fruit and hang them under cover on string lines in an airy place. The olives gradually shrivel and take on the appearance of miniature prunes. The bitter flavour of the fresh fruit disappears entirely, and the dried olive has a delicious oily taste.

Viticulture.

HINTS TO GRAPEGROWERS.

By C. A. GATTINO.

TREATMENT OF THE VINE TILL FRUIT-BEARING.

(Continued from October, 1917.)

After having properly planted the vines as previously described, whether cuttings or rooted plants, shorten the top, leaving only one bud above the earth.

At the second year cut them back to one or two buds, according to the vigour of the growth.

At the third season prune them from two to four buds, so as to prepare the shoots to become fruit-bearing and make the main stem strong.

There are many methods of training the vines during the first two years (which may do to follow in gardens or against walls), but the system of foundation pruning mentioned above, was followed by myself and gave the most satisfactory results for vineyard culture.

Everybody knows that vines cannot produce fruit unless from wood two years old. There are often bunches growing from cuttings during the first year planting, but the buds from which they shoot were formed in the previous year.

It is, therefore, necessary to produce each year new wood to supply the place of the one which was previously fruit-bearing, so as to get bunches for the following year.

This is the fundamental principle of yearly pruning.

During these two years the ground will have to be kept well cultivated and free from weeds, taking care to replace each year in the fall (when the leaves have dropped), all dead and unhealthy plants with new-rooted plants of the same age.

To assist growers, who start with small capital, I recommend to plant other crops between the rows of the vines. This would not affect the growth of the vines, especially if the rows were planted for this purpose, as in accordance with my previous notes on planting.

I believe that the most suitable crop to plant is maize: this, besides giving a profitable return, allows the vines to prosper normally. This crop is appropriate in vineyards planted with wide rows, but for other systems of viticulture with narrow rows, there is no better cultivation than the potato.

This vegetable has a limited root development and does not injure the vines, on the contrary, the foliage of the vine and the foliage of the potato are subject to similar diseases, hence, if spraying becomes necessary, the one operation benefits both, and potatoes are always a highly profitable crop.

By using the proper manure, a double result will be obtained—that is, a good crop of potatoes and a strengthened and prolific grape-bearing vine.

When the potatoes are dug, I advise as a good practice the burying of the tops in the holes from where the potatoes were dug, thus returning to the soil moisture and humus.

P.S.—In my next notes I will give some hints about pruning.

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, Government Botanist.

No. 12.

TWIGGY MULLEIN (*Verbascum Virgatum*, *With.*).

Description.—A tall stiff erect-growing glandular herbaceous plant of biennial duration. Stem simple or branched. Leaves oblong-lanceolate, toothed or crenate. The radical ones large and forming a rosette at the base of the stem, the upper ones alternate. Flowers yellow 1-1½ in. diam., solitary or in clusters of 2-5 in the axils of a bract and with two bracteoles at the base of each pedicel. Pedicels (flower-stalks) short. Stamens 5, filaments with long purplish hairs. Capsules globular. Seeds numerous, very small, rough, light brown or greyish in colour.

Distribution.—A native of the Mediterranean region and western Europe. Naturalised in the cooler parts of British India, the Pacific States of North America, and in Australia. In Queensland a common weed but not particularly aggressive; it is common on the Darling Downs, on the southern coastal areas, and in the Atherton tableland district in North Queensland. J. M. Black records it as a common naturalised alien in South Australia.

Notes on the Identity of the Species.—This plant has previously been recorded for Queensland under the name of *Verbascum Blattaria*, from which it differs in its very much shorter flowering and fruiting pedicels. *Celsia cretica*, a closely allied plant, has also been recorded as naturalised in Queensland. I have never, however, seen authentic material, all the specimens I have seen so labelled belonging to the plant now under notice. *Verbascum virgatum*, with its long racemes of large yellow flowers, is quite a handsome plant, and was no doubt introduced as a garden species.

SOAPSUDS AND SULPHUR FOR ROSES.

If people who have roses and love nice, clean foliage on the rose bushes would use a spray each wash day, applying the suds to the foliage, they need never be troubled with the rose pests.

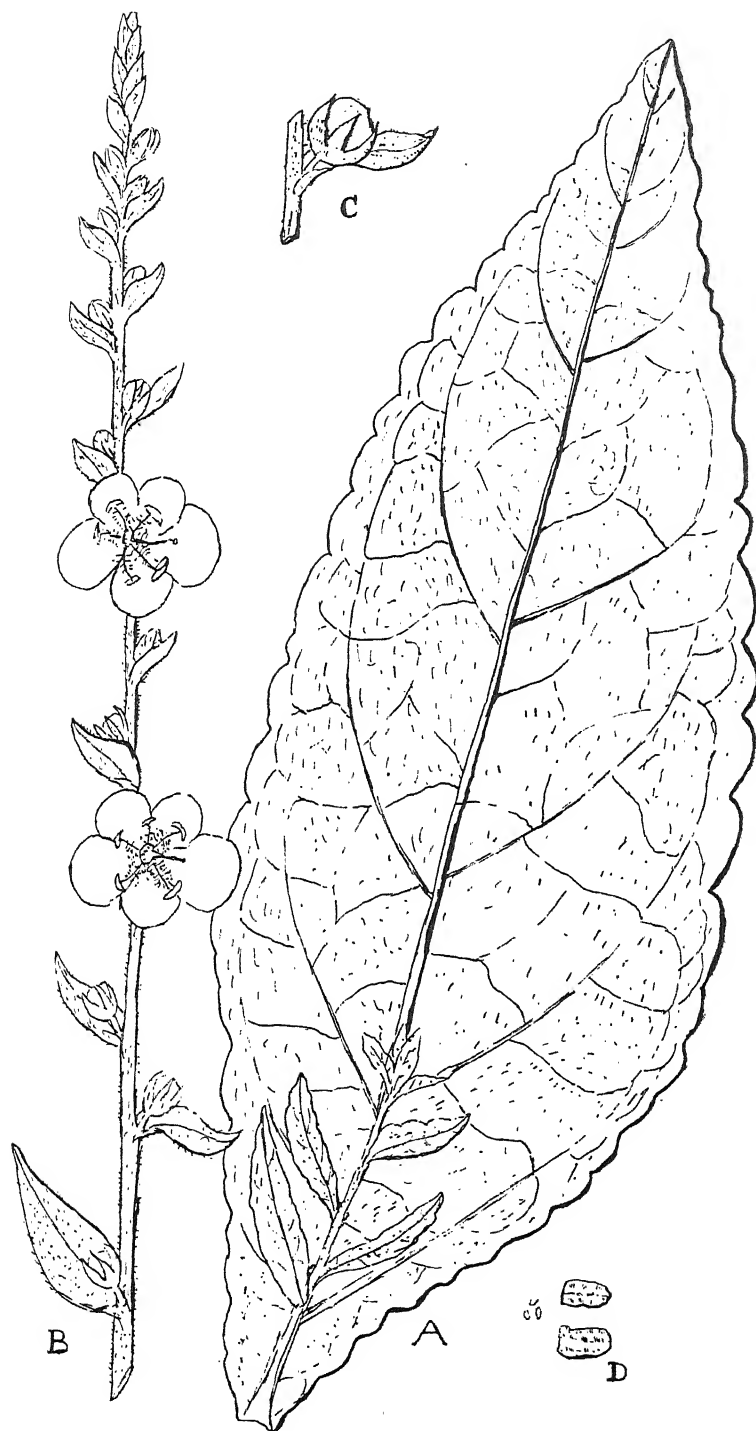
In many localities there is a mildew on the rose foliage. Even this may be prevented by the use of the soapsuds with a little powdered sulphur added.

Try these remedies, and you will find them very valuable in preventing such troublesome pests in the rose garden.

APIARY NOTES.

Mr. Geo. Butler, hon. sec., Queensland Beekeepers' Association, in reply to several questions by an intending beekeeper, replies as follows:—

“The first essential, and one which is of the greatest importance, is to procure bees in standard hives. This will save you a lot of annoyance, and in case it becomes necessary to dispose of them at any time, you will not experience the same difficulty which would occur were the hives of different dimensions to those in general use. Do not purchase a great number at first. One or two is quite sufficient, and when you have become conversant with the habits of the bees, you may launch out with confidence. For your purpose I would advise you to use half supers. They are much easier to manipulate, and the bees are more readily driven out of the super. A few puffs of smoke will suffice to free the super of bees, which can then be taken away and the honey extracted. The cost of a colony of bees is about £2. It is advisable to purchase your colonies from an experienced beekeeper. He will give you good stock, and impart any information you may require.”

PLATE 5.—TWIGGY MULLEIN (*Verbascum virgatum*).

A Basal leaf with young axillary shoot. B Top portion of raceme. C Capsule.
D Seeds, natural size and enlarged.

Entomology.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report on Cane Grub Investigation from the Entomologists at Gordonvale (Dr. J. F. Illingworth and Mr. E. Jarvis):—

The heavy rains at the beginning of November have started the emergence of the grey-back cane beetles. Now is the time for everyone to be in harness, for it is only by co-operation that we shall have strength to successfully combat this terrible pest. The valuable information possessed by the growers, if collected and properly summarised, might enable us to complete our investigations several years earlier than if we were left to work out all the problems ourselves. Each one owes it to his own interest, as well as to the interest of the industry, to send in any information that he possesses along the line of the questions published on page 383 of the September "Sugar Journal." We are placing considerable faith in cultural methods, and desire all possible evidence. However, there must be no let-up to the collection of both beetles and grubs for the present, or, at least, until we discover a more economical method of control. I cannot urge this collecting too strongly, for there appears to be a lack of interest among growers now that a new Entomologist is appointed to handle the problem. Of course it is a well-understood fact that every female beetle destroyed within two weeks after emergence destroys all her progeny; and it is really an economical procedure if we can get them at this time.

As I have indicated before, we can place little dependence upon parasites for these native pests; and other control measures must be worked out. Though collecting the beetles and grubs is expensive, the expense is not prohibitive, and we know that by this method the pests are destroyed.

USE OF FIRES AND LIGHT-TRAPS.

Mr. Jarvis's experiments last season certainly showed that our common cane beetles are greatly attracted to lights, and this line of experiments is worth following up, for it is a subject that lends itself to extensive application. Numerous light-traps should be rigged up at the first appearance of the beetles. A trap can be made by simply suspending a lantern over a tub of water with a little kerosene on the surface. The trap should be sufficiently elevated to have the light visible from every direction. The flying beetles bump against the glass and fall into the kerosene-covered water, where they are quickly killed.

Recent experiments with small fires are encouraging; and undoubtedly vast numbers of the beetles, during their flight, succumb in the fires of the cane-fields. Anyway, we are continuing investigation of this important matter, and advocate small fires, started just at dark and kept up for about an hour, every evening during the flight of the beetles.

Where a large field of trash is to be burnt at this time, it would be well to conserve it by separating it into small blocks, and burn a little each evening. It may be profitable to save up rubbish of all kinds for fires at this time.

LEPIDIOTA FRENCHI AT MERINGA.

This grass-feeding species, recently described in detail by Mr. Jarvis, is becoming a serious pest of sugar-cane at Meringa. In one field of first ratoons, the grubs have gradually worked back from the grassy roadside, completely destroying patches of the cane by eating off all the roots. In digging up the dying stools, we found from six to ten large Stage III. grubs of this species. These same grubs, in their younger stages, did considerable damage to the plant-cane last year; and now, in their final stage, they are cleaning up some of the ratoons entirely. The owner of this field is treating the infested area, at our suggestion, with carbon bisulphide, in the hope of destroying these centres of infestation, which are evidently spreading to the surrounding healthy cane. The grubs, if left alone, would feed for several months yet, and emerge as beetles next year, since they have a two-year life cycle. Large grubs ploughed up at this season in grass-land are very apt to belong to this species; for all grubs of the common grey-back cockchafer changed to beetles, far below the reach of the plough, several months ago.

There is an excellent crop of cane on the half-acre plot treated with arsenic last season by Mr. Jarvis. Unfortunately, the experiment is not conclusive, because the owner treated the surrounding cane with carbon bisulphide without leaving the necessary check-plots. However, though the grubs were evidently not very bad in this locality last season, a few untreated rows left at the far end of the field became somewhat infested, so that a part of the cane fell over. Walking through the field, it is evident that the part treated with arsenic is just as vigorous as that treated with carbon bisulphide, and certainly the cost of the arsenic is considerably less.

Our 10-acre block at Meringa has all of the weedy-trash ploughed in, and a part of it is covered with a heavy growth of Mauritius bean. Since we were unable to get labour to put this land in shape for October planting, we are now planning to leave the part covered with bean and work the balance through the flight of the beetles, getting all of the 15 plots ready for March-planting.

Mr. Warner's co-operation with our department at Greenhills is going to be a mutual benefit. We shall have about a dozen plots, of an acre or more each, demonstrating principally cultural methods and the effects of poisons, fertilisers, &c.

MUSCARDINE FUNGUS.

Experiments started in August last with the green Muscardine fungus have shown that *Lepidiota frenchi* (Black) is victimised by this vegetable parasite.

Second-stage grubs of the above beetle were placed in cages containing infected soil of various degrees of moisture, with the result that those kept in very damp earth died in from 19 to 49 days, while

the percentage attacked by the fungus in drier soil was smaller and extended over a longer period. Judging by the results of another experiment with *frenchi* grubs, it seems probable that high soil temperatures do not favour the development of the fungus, since 75 per cent. of the grubs confined in cages kept at about 70 degrees Fahr. succumbed within a month, whereas those subjected to higher soil temperatures remained unaffected. We propose carrying out further experiments along these lines, in order to determine the action of this fungus on newly hatched first-stage grubs of our grey-back beetle. In this connection it may be mentioned that a bacterial disease of white grubs in America is engaging the attention of entomologists, and possibly if introduced into Queensland might prove beneficial. Grubs attacked by this organism, which is a species of *Micrococcus*, are characterised by a blackening of the affected parts.

Excessive wet apparently favours its development, so that our climate here, during the wet season, should afford suitable conditions for infection in the field, since at that time of year (January to March) grubs of *Albohirta* are doing the most damage.

The *Bacterium* in question is able to exist for over a year under artificial conditions, and has been successfully reproduced in healthy grubs by making an incision in the skin and placing them in infected soil.

Research work dealing with the economy of digger-wasps and other parasites is well in hand.

The life-cycle of *Campsomeris radula*, Fab., a scoliid wasp that preys on several kinds of cane beetles, is being successfully traced from eggs laid by this parasite at our Insectary.

Certain species of Dexiidae, the maggots of which subsist on larvae of cockchafers, are also receiving attention, and it is hoped that further study in this direction may result in discoveries of economic value.

Our general collection of insects has been added to as opportunity offered. Several interesting species of Dexiidae, Sarcophagidae, and other Diptera, hitherto uncollected, have been obtained from scrub land.

As the hot weather advances, numerous fresh species of all kinds of insect life make their appearance, some of which are intimately associated with various pests of sugar-cane.

SCALE-FEEDING HABITS OF A PORTO RICAN MILLIPEDE.

RHINOCRICUS ARBOREUS, Saussure.

The journal of the Department of Agriculture of Porto Rico, U.S.A., July, 1917, contains an interesting note on the abovementioned millipede by R. T. Cotton, Assistant Entomologist, Insular Experiment Station. He says:—

“While investigating the feeding-habits of some of the common millipedes of the island, to ascertain whether or not they were injurious to truck crops, I was surprised to find that one of the species had the very interesting habit of feeding on the purple scale of citrus—*Lepidosaphes beckii*.

“ This millipede is a large, dark reddish-brown form about 8 m.m. long (8-25 inch). It was identified by Dr. R. V. Chamberlin, of the Museum of Comparative Zoology, Cambridge, Massachusetts, as *Rhinocricus arboreus*, who stated that it is known in several other West Indian islands.

“ It was while walking through a citrus grove at Rio Piedras, P.R., that my attention was attracted by seeing several specimens of this millipede among the branches of a grape-fruit tree that was heavily infested with the purple scale. Pausing to watch them for a few minutes, I noticed that they were feeding voraciously on the scale, and smooth, clean patches on the scale-infested branches indicated where they had been at work. Transferring them to the laboratory, I placed them on grape-fruit twigs that were completely covered with scales, and in a very short time the twigs were cleaned off. Some idea of the voracity of this millipede may be gained from the fact that one specimen, by actual count, consumed two thousand scales in a period of three hours, and, after a short rest, continued feeding.”

Mr. Cotton decided to try and entirely clear an infested tree of the scale by them. He captured a number and placed about a dozen in each of several badly-infested grape-fruit trees. They at once began feeding on the scales, and at the end of two weeks the trees were perfectly clean, free from scales, and the bark took on a fresh green colour.

We submitted Mr. Cotton's note on the *Rhinocricus arboreus*, to Mr. H. Tryon, Government Entomologist in this State, and he has commented upon it as follows:—

“ It is usually held that all millipedes favour, or exclusively affect, a vegetable diet. This, indeed, is the opinion of F. G. Sinclair, the author of the animal division—‘ Myriapoda,’ for the Cambridge Natural History. Thus he writes (*Op. cit.*, p. 30):—‘ We have the Chilognatha or millipedes distinguished (from the Chilapoda or Centipedes) by their slow movements and vegetable diet.’

“ The habits of some of the arboreal members of the group occurring in Queensland are, however, scarcely consistent with this position.

“ This remark may or may not apply to our species of *Rhinocricus*, since in their case the feeding habits have not been made a matter of observation, either by myself or by anyone with whom I am acquainted; and Queensland, I may add, possesses several different kinds in its fauna—e.g., *R. brevipes*, Karsch; *R. crepidatus*, Karsch; and *R. opulentus*, Silvestri.

“ But Mr. Cotton's statements are, however, sufficiently interesting to justify one in inquiring, and by way of experiment, how far the habits of the Porto Rican *Rhinocricus arboreus*—the subject of his note—are shared by any of these or other of our representatives of its genus; and especially so, seeing that the scale insect (*Lepidosaphes bechii*), that he has found it will devour with such avidity, is, too, one of the more notorious of our plant pests.

“ He fails—it may be remarked—to distinguish, in anything that he has written, between habits evinced under special circumstances and

those generally displayed in feeding; and, obviously, it cannot be contended, with any regard to truth, that *R. arboreus* devours generally, much less commonly, the insect that he has found it to be so injuriously related to: much less, that it partakes of it exclusively. But, of course, this is a very important point in deciding the measure of its usefulness.

"Recently, I observed a native bird—the common leather head (*Philemon corniculatus*)—removing examples of a particular scale insect (*teroplastes cerifera*), one by one, from a tree that the latter had infested; and seeing it at work I had no doubt that were I to confine bird and tree in a common enclosure the former would soon completely rid the latter of its insect enemy. Now I do not propose to advance this observation as embracing the whole of the facts regarding the bird's dietary. This applies to the Porto Rican Millipede in question. Wherefore, we must not read into Mr. Cotton's statement of facts more than he intends us to imply."

RICE BRAN.

In feeding horses with rice bran, substitute the same weight—not measure—as the corn superseded. A quart of corn weighs 1 lb. 14 oz.; a quart of rice bran 1 lb., so it does not do to feed by measure, unless the weight is taken into account.

In feeding cows, give one-fifth more of rice bran in place of wheat bran, add salt in order to induce the beasts to take it. Some beasts accustomed to certain foods will not readily take to others.

It will be interesting to those who are interested in food for stock to peruse the following analyses of common foodstuffs for stock as made by the Director of Agriculture in Mauritius, which we take from the West India Circular:—

	Digestible Fibre or Cellulose.	Digestible Fats or Oils.	Digestible Proteins or Albuminoids.	Digestible Non- albuminoids Carbohy- drates.	Albuminoid Ratio.	Starch Equi- valent.
Rice Bran	6.2	6.1	7.8	33.5	6.9	72
Wheat Bran	6.8	2.6	10.0	35.0	4.7	71
Maize Seeds (Corn) ..	1.1	4.0	8.9	45.4	6.0	75
Oats (Grains)	7.2	4.3	9.3	40.7	6.2	79

HOME-MADE NIGHTLIGHT.

A glass of water, by a simple arrangement, can be turned into a useful candle-stick. Fill a tumbler three-quarters full of water. Take a piece of ordinary wax candle and stick a nail into its lower end in the same line with the body of the candle. The nail is for ballast; be careful in choosing it that it is of the right thickness and weight to cause the candle to float with only a quarter of an inch above the water. If properly balanced, the candle will burn steadily down to the bottom. The sides of the tumbler prevent air currents reaching the flame, and if the glass stands on a firm substance the water will not flow over the edge of the candle, for as the flame burns and the candle gets shorter it becomes at the same time lighter, and rises. The flame really burns more steadily than if the candle were in an ordinary candlestick, for not only are there no air currents to blow the flame about, but the water keeps the outside of the candle cool, so that the flame works out a kind of cup for itself in the wax. The next time you want a nightlight try this simple experiment.—"Farmers' Union Advocate," New Zealand.

SOUTHERN FRUIT MARKETS.

Article.	DECEMBER.	
	Prices.	
Bananas (Queensland), per crate	8s. to 11s.	
Bananas (Tweed River), per crate	11s. to 13s.	
Bananas (Fiji), per crate ... ..	...
Bananas (G.M.), per crate ... ..	...
Mangoes, per case	4s. to 5s.	
Oranges (Navel), per case	10s. to 14s.	
Oranges (Seville), per bushel case ... ..	...
Oranges (other), per case	6s. to 7s.	
Papaw Apples, per half-bushel case	7s. to 10s.	
Passion Fruit, per half case	8s. to 11s.	
Pineapples (Queens), per double case	10s. to 12s.	
Pineapples (Ripleys), per double case	7s. to 10s.	
Pineapples (Common), per double case	7s. to 10s.	
Tomatoes (Queensland), per half-bushel case	4s. to 5s.	
Cucumbers, per bushel case	6s. to 8s.	
Strawberries, per lb.	5d. to 6d.	

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	DECEMBER	
	Prices.	
Apples, Eating, per bushel case	20s. to 28s.	
Apples, Cooking, per bushel case	15s. to 16s.	
Apricots, per case	7s. 6d. to 11s.	
Bananas (Cavendish), per dozen	1d. to 4 ¹ / ₂ d.	
Bananas (Sugar), per dozen	1 ¹ / ₂ d. to 3 ¹ / ₂ d.	
Cape Gooseberries, per quarter-case	6s. to 9s.	
Cherries, per case	4s. to 7s.	
Citrons, per hundredweight	11s.	
Cocoanuts, per sack	12s. to 15s.	
Cumquats, per quarter-case ... ..	...
Lemons (Lisbon), per case	8s. 6d. to 15s.	
Mandarins, per case	10s. to 15s.	
Mangoes, per case	3s. to 6s.	
Oranges (Navel), per case	17s. 6d.	
Oranges (Seville), per hundredweight	3s. 6d. to 10s.	
Oranges (other), per case	6s. to 12s.	
Papaw Apples, per quarter-case	1s. to 3s.	
Passion Fruit, per quarter-case	6s. to 10s. 6d.	
Peaches, per quarter-case	1s. to 5s. 6d.	
Pears, per quarter-case	12s. 6d. to 18s. 6d.	
Peanuts, per lb.	4d. to 6d.	
Pineapples (Ripleys), per dozen	2s. 6d. to 6s.	
Pineapples (Rough), per dozen	2s. to 6s. 3d.	
Pineapples (Smooth), per dozen	2s. to 5s. 6d.	
Plums, per case	2s. to 5s.	
Rockmelons, per dozen	7s. to 10s.	
Strawberries, per dozen boxes	4s. to 10s.	
Tomatoes, per case	2s. to 3s. 6d.	
Watermelons, per dozen	6s. to 12s.	

TOP PRICES, ENOGGERA YARDS, NOVEMBER, 1917.

Animal.	NOVEMBER.	
	Prices.	
Bullocks	£20 12s. 6d. to	£25 2s. 6d.
Bullocks (Single)	£29 5s.	
Cows	£13 5s. to	£17
Cows (Single) ... ..	...
Merino Wethers	47s. 3d.	
Crossbred Wethers	39s. 9d.	
Merino Ewes	35s. 6d.	
Crossbred Ewes	39s. 9d.	
Lambs	41s. 6d.	
Pigs (Bacon) ... ..	...
Pigs (Porkers)	69s.	
Pigs (Suckers) ... ..	...

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF NOVEMBER 1917, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING NOVEMBER, 1917 AND 1916, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Nov.	No. of Years' Records.	Nov., 1917.	Nov., 1916.		Nov.	No. of Years' Records.	Nov., 1917.	Nov., 1916.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton	1.90	15	6.33	5.21	Nambour	3.44	20	14.68	4.21
Cairns	4.22	34	7.24	2.13	Nanango	2.39	34	8.56	7.34
Cardwell	4.20	44	11.44	4.46	Rockhampton	2.08	29	5.61	3.33
Cooktown	2.97	40	3.77	1.06	Woodford	2.92	29	10.43	5.58
Herberton	2.45	29	3.87	2.39					
Ingham	3.84	24	10.80	5.25	<i>Darling Downs.</i>				
Innisfail	6.55	35	9.34	2.23	Dalby	2.47	46	5.63	7.59
Mossman	15.78	5	13.26	2.36	Emu Vale	2.38	20	4.62	4.85
Townsville	1.63	45	13.17	3.75	Jimbour	2.30	28	5.91	5.74
<i>Central Coast.</i>					Miles	2.27	31	9.94	7.28
Ayr	1.35	29	12.50	5.14	Stanthorpe	2.74	43	4.84	2.89
Bowen	1.25	45	6.34	1.58	Toowoomba	3.13	44	8.98	7.48
Charters Towers	1.31	34	4.70	2.89	Warwick	2.48	29	5.11	5.22
Mackay	2.90	45	6.57	3.93					
Proserpine	3.13	13	8.09	2.42	<i>Maranoa.</i>				
St. Lawrence	2.27	45	8.01	1.93	Roma	2.04	42	2.26	6.42
<i>South Coast.</i>									
Biggenden	2.32	17	10.91	4.93	<i>State Farms, &c.</i>				
Bundaberg	2.51	33	6.48	6.17	Bungewongorai	2.16	4	...	6.84
Brisbane	3.73	66	12.41	6.17	Gatton College	2.41	17	7.60	4.96
Childers	2.55	21	7.96	6.66	Gindie	1.79	17	7.11	4.90
Orohamhurst	4.25	23	12.31	6.38	Hermitage	2.16	10	5.25	5.60
Esk	2.96	29	7.54	5.43	Kairi	2.15	5	2.49	5.64
Gayndah	2.75	45	7.18	5.76	Kamerunga	3.02	26	7.87	2.55
Gympie	3.07	46	9.81	3.80	Sugar Experiment Station, Mackay	2.44	19	5.97	...
Glasshouse M'tains	3.44	8	12.96	2.28	Warren	3.75	5	6.81	8.27
Kilkivan	2.51	37	4.97	3.44					
Maryborough	3.02	45	7.93	6.60					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for November this year and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	4:57	6:46	5:21	6:41	5:41	6:19	5:58	5:46	PHASES OF THE MOON. The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.
2	4:58	6:46	5:22	6:41	5:41	6:18	5:59	5:45	
3	4:59	6:46	5:23	6:40	5:42	6:17	5:59	5:44	
4	4:59	6:46	5:24	6:40	5:43	6:16	6:0	5:43	
5	5:0	6:46	5:25	6:39	5:44	6:15	6:0	5:42	5 Jan.) Last Quarter 9 49 p.m.
6	5:1	6:47	5:25	6:39	5:45	6:14	6:1	5:41	13 „) New Moon 8 36 a.m.
7	5:2	6:47	5:26	6:38	5:45	6:13	6:1	5:39	20 „ (First Quarter 12 38 „
8	5:3	6:47	5:27	6:37	5:46	6:12	6:2	5:38	27 „ O Full Moon 1 14 p.m.
9	5:3	6:47	5:28	6:36	5:46	6:11	6:2	5:37	The Moon will be at Perigee on 15th, Apogee on 3rd and 31st.
10	5:4	6:48	5:29	6:35	5:47	6:10	6:3	5:36	
11	5:5	6:48	5:29	6:35	5:47	6:9	6:3	5:35	4 Feb.) Last Quarter 5 52 p.m.
12	5:6	6:47	5:30	6:34	5:48	6:8	6:4	5:34	11 „) New Moon 8 5 „
13	5:6	6:47	5:31	6:33	5:48	6:7	6:4	5:33	18 „ (First Quarter 10 57 a.m.
14	5:7	6:47	5:32	6:32	5:49	6:6	6:5	5:32	26 „ O Full Moon 7 35 p.m.
15	5:8	6:47	5:32	6:32	5:49	6:5	6:5	5:31	The Moon will be at Perigee on 12th, Apogee on 28th.
16	5:9	6:47	5:33	6:31	5:50	6:8	6:6	5:30	
17	5:9	6:47	5:34	6:30	5:50	6:2	6:6	5:29	
18	5:10	6:47	5:35	6:29	5:51	6:1	6:7	5:28	6 Mar.) Last Quarter 10 44 a.m.
19	5:11	6:47	5:35	6:28	5:51	6:0	6:7	5:27	13 „) New Moon 5 52 p.m.
20	5:12	6:46	5:36	6:28	5:52	5:59	6:8	5:26	19 „ (First Quarter 11 30 „
21	5:13	6:46	5:37	6:27	5:52	5:58	6:8	5:25	28 „ O Full Moon 1 33 „
22	5:13	6:46	5:37	6:26	5:53	5:57	6:8	5:24	The Moon will be at Perigee on 13th, Apogee on 27th.
23	5:14	6:45	5:38	6:25	5:53	5:56	6:9	5:23	
24	5:15	6:45	5:38	6:24	5:54	5:55	6:9	5:23	
25	5:16	6:45	5:39	6:23	5:54	5:54	6:10	5:22	4 April) Last Quarter 11 33 p.m.
26	5:16	6:44	5:39	6:22	5:55	5:53	6:10	5:21	11 „) New Moon 2 34 „
27	5:17	6:44	5:40	6:21	5:55	5:51	6:11	5:20	18 „ (First Quarter 2 8 „
28	5:18	6:43	5:40	6:20	5:56	5:50	6:11	5:19	26 „ O Full Moon 6 5 „
29	5:19	6:43	...	...	5:57	5:49	6:12	5:18	The Moon will be at Perigee on 10th, Apogee on 23rd.
30	5:19	6:42	...	...	5:57	5:48	6:12	5:18	
31	5:20	6:42	...	...	5:58	5:47	...	...

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset may be roughly arrived at by adding 17 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

For the sunrise and sunset at Rockhampton, Townsville, Cairns, and other places in Queensland, readers may be referred to the "Queenslander" to which newspaper monthly astronomical notes will be supplied.—D.E.

Farm and Garden Notes for February.

FIELD.—The land intended for potatoes should now be ready for planting. Plant sound small potatoes, well shot, without cutting them. If large potatoes are cut into sets, there is a risk of their rotting, as the usual wet weather may be expected, with a hot, muggy atmosphere. Weeds will be very troublesome, and for that reason the sowing of lucerne should be deferred till later. Sow lucerne in deep rich soil, thoroughly worked and deeply ploughed. Cape barley, panicum, kafir corn, imphee, sorghum, and vetches may be sown; but it is risky to plant maize for a late crop, as early frosts would destroy the ripening grain. For an early winter crop, sow swede turnips and mangel wurtzels. Pick cotton as the bolls burst. Do not pick until the dew has dried off the bolls. Expose the picked cotton for a couple of hours to sun heat.

KITCHEN GARDEN.—Make preparations for good crops of vegetables for the early winter by ploughing or digging all unoccupied land, supplying well-rotted manure if needed. Chicken guano is also an excellent fertiliser, if prepared as follows:—

Spread a layer of black soil on the ground. Dump the fowl manure on to this, and pound it fine with the back of a spade; add hardwood ashes, so that the compound shall contain—Soil, 3 bushels; fowl manure, 2 bushels; ashes, 1 bushel. Mix thoroughly, and a little before planting moisten the heap with water, or, better still, with urine; cover with old mats, and let it lie till needed.

Most market gardeners will have cabbages and cauliflowers ready for transplanting. Do this during the month. In the pamphlet on "Market Gardening," issued by the Department, it is recommended to sow the seed from the middle of January to the middle of March, arranging the time, however, to suit early and late districts. For winter crops, the Drumhead type, of which Flat Dutch and Queensland or Florida Headen are good examples, are the most profitable. The Savoy cabbage does well here. The best cauliflowers to grow are the Large Asiatic, Eclipse, Early Dwarf, and Le Normand. If the aphid appears, spray with tobacco solution.

Sow French beans, butter beans, beet, carrot, turnip, radish, cabbage, cauliflower, cress, peas. Should the weather prove dry after the January rains, give the plants a good soaking with water. Gather all fruit of cucumbers, melons, French and other beans, and tomatoes as they ripen, to ensure the continued production of the vines and plants.

FLOWER GARDEN.—Thin out and tie up dahlias. Keep the weeds down, and never allow them to seed. Sow hardy annuals. This is the best month for sowing, as you will be able to keep up a succession of bloom during the succeeding months of autumn and winter. To ensure this, sow phlox, pansy, daisy, stocks, aster, nasturtium, hollyhock, candytuft, mignonette, sweet peas, dianthus, carnations, cornflower, summer chrysanthemum, verbenas, petunias, pentstemons, &c. Dianthus, sown now and planted out in March, will bloom during the whole year, if the dead stalks and blooms are regularly cut away.

Do not sow flower seeds too deep, as on the depth will depend greatly what results you will have as regards the seed germinating. It is easy to remember that seeds should be covered with fine soil to a depth equal to their own size; for instance, a pea is about one-eighth of an inch in diameter, therefore, cover it with one-eighth of an inch of soil.

Orchard Notes for February.

In order that the series of monthly notes that have appeared for some years past in the "Agricultural Journal" might be rendered of more value to our fruit-growers, advantage was taken of the commencement of the new year to revise them and bring them up to date. At the same time, the notes have been somewhat altered, as, instead of making them of a general nature, applicable to the whole of the State, they are, to a certain extent, localised, as, although the general principles of cultivation, manuring, pruning, treatment of fruit pests, as well as of the handling and marketing of the fruit, are applicable to the State as a whole, there are many

matters that are of interest to individual parts of the State rather than to the whole State; and, further, notes that are applicable to the Southern part of the State for one month are not always applicable to the North for the same month.

In order to carry out this idea the State has been divided as follows:—

1. The Southern Coast Districts, south of the Tropic of Capricorn;
2. The Tropical Coast Districts;
3. The Southern and Central Tablelands.

This plan has met with such general approval during the past year that the notes will henceforth be published in accordance therewith.

THE SOUTHERN COAST DISTRICTS.

The earlier summer fruits, including grapes, will be pretty well over, but pineapples, mangoes, and bananas are in full fruit. The bulk of the main summer crop of pines ripens during the month, and growers are in consequence kept very busy sending them to both our local markets and canneries, and to the Southern States. The planting of all kinds of tropical fruits can be continued where necessary, though earlier planting of both pines and bananas is to be recommended. Still, if the land is thoroughly prepared—viz., well and deeply-worked—they can be planted with safety, and will become well established before winter. The month is usually a wet one, and both tree and weed growth is excessive. If unable to get on the land with horses to keep down weed growth, use the scythe freely in the orchard before weeds seed, as by doing so you will form a good mulch that will tend to prevent the soil washing, and that when ploughed in later on will add a considerable quantity of organic matter to the soil, thus tending to improve its mechanical condition, its power of absorbing and retaining moisture, as well as to increase its nitrogen contents.

This is the best month of the year in which to bud mangoes in the Brisbane district. The bark of the stock to be budded must run very freely, and the scion, when placed in position, must be tied very firmly. The bark of the scion should be slightly thicker than the bark of the stock, so that the material used to tie it keeps it firmly in its place. As soon as the bud is tied, ringbark the stock just above the bud, so as to force the sap of the stock into scion, so that a union will take place quickly.

Where cyaniding of citrus and other trees has not been concluded it may be continued during the month, as fruit treated now will probably keep clean and free from scale insects till gathered. If the trees have been treated with Bordeaux mixture, do not cyanide, as cyaniding should always be done previous to spraying with Bordeaux mixture.

If Maori is showing, spray with the sulphide of soda wash. Look out for Black Brand and also for the Yellow Peach Moth towards the end of the month in the earlier districts. Spraying with Bordeaux mixture is advisable in the case of both of these pests.

Get land ready for strawberry planting, so as to be ready to set out runners next month. Some growers set out plants as early as the end of February, but March is to be preferred. Citrus and deciduous trees can still be budded during the month. Young trees in nursery should be kept clean and attended to; ties should be cut where necessary, and the young trees trained to a straight single stem.

THE TROPICAL COAST DISTRICTS.

As the month is usually a very wet one in this part of the State, very little work can be done in the orchard other than keeping down excessive weed growth by means of a scythe. When citrus trees are making excessive growth and throwing out large numbers of water-shoots, the latter should be cut away, otherwise they are apt to rob the rest of the tree, and thus injure it considerably. Many of the citrus trees will come into a second blossoming during the month, and this will produce a crop of fruit ripening towards the end of winter and during the following spring. The main crop, where same has set in spring, will be ripening towards the end of the month, but as a rule insect life of all kinds is so prevalent at this time of year that the bulk of the fruit is destroyed. Where there is sound fruit, however, it will pay to look after. If the weather is wet is should be artificially dried before packing; but if there are periods of sunshine, then the fruit can be cut and laid out on boards or slabs in the sun, so that the extra moisture of the skin can be dried out. Care will have to be taken not to sun-scald the fruit, or to dry it too much; all that is required is to evaporate the surplus moisture from the skin, so that the fruit will not speck when packed.

Tropical fruits of all sorts can be planted during the month. Budding of mangoes and other fruits can be continued. Bananas must be kept netted, as fly is always bad at this time of year.

THE SOUTHERN AND CENTRAL TABLELANDS.

The marketing of later varieties of apples, pears, plums, peaches, and nectarines will occupy the attention of the Stanthorpe growers. The grape harvest will also extend right through the month. Every care should be taken to see that the fruit fly and codling moth are not allowed to spread, although the best work in fighting these pests has to be done during the months of December and January, as on the action then taken, if carried out systematically, the freedom of the later fruits from infestation mainly depends.

Handle the fruit carefully, and see that no fly or codling moth infested fruit leaves the district. The grapes, ripening as they do when this fruit is over in the earlier parts of the State, should be sent not only to Brisbane, but to all other parts of the State. For long shipment nothing can beat crates holding 6-lb. baskets. The fruit should be gathered some hours before packing, and be placed in the sun, so as to become thoroughly dry, and to allow the stems to become wilted, as this causes the fruit to hang on the bunch much better, and consequently to reach its destination in better order.

If parrots and flying foxes are troublesome, organised shooting parties or poisoning with strychnine are the best means of dealing with those pests.

The crop of grapes will be about over in the Roma and other inland districts. Citrus trees, when infested by Red Scale, should be cyanided. The orchard should be kept well cultivated after every rain, and when there is no rain, but water is available for irrigation, if the soil requires it, the trees should get a good soaking, which, if followed by thorough cultivation, will carry the trees on till the fruit is ripe.

TO PICKLE CHILLIES.

Take large green capsicums and slit them sufficiently to remove the seeds. Then make a brine of salt and water of sufficient density to float an egg. Place the chillies in this when the brine is cold, and let them remain there for twenty-four hours, then drain again, rinsing in cold water; then place in wide-mouthed stone or glass jars. Now take vinegar and water in the proportion of one quart of vinegar and one quart of water to every thirty chillies. Heat to boiling point and pour it over the peppers in the jars; leave it to stand till cold, then drain off this vinegar and water and throw it away. Heat fresh vinegar now without water, and pour it over the peppers boiling hot. Cover the jars tightly and set in a cool place.

We find many recipes which must commend themselves to dwellers in a hot country in the excellent "Journal of the Jamaica Agricultural Society." The chilli pickle is one; another is—

TO MAKE CHILLI SAUCE.

Take 1 dozen large tomatoes, 2 large onions, and 4 green chillies; peel the tomatoes and onions, and chop them up fine, also chop the green chillies fine. Keep them all separate till chopped, then mix and stir all together, adding two table spoonfuls of salt, two table spoons of sugar, one of cinnamon, and three tea cups of vinegar. Boil the whole steadily and slowly about an hour and a-half, stirring well all the time. Then bottle.

TO MAKE CHILLI VINEGAR.

Take, say 50 chillies to 1 pint of vinegar. Mash the chillies, then place them in a close jar or wide bottle, adding the vinegar, then cover tightly. At the end of four weeks uncover, strain, and bottle.

CREOLE PICKLES.

Ingredients.—3 or 4 cucumbers, 8 or 10 onions, 1 or 2 young spadices of cabbage palm, 1 or 2 green pawpaws, a few cut open peppers, a little whole allspice, Coleman's mustard, 2d.; curry powder, 2d.; turmeric, 1d.; black pepper and salt in proportion, and enough vinegar to cover the whole. *Mode.*—Cut up the cucumbers and onions, and soak in salt and water the day before, cut up the pawpaw and cabbage and boil each one in salt and water, but only until they break easily. Put the vinegar into a saucepan, and when it boils put in the cabbage and pawpaw and add, in a little while, the cucumber and onion, spices, and ground black pepper. Mix the mustard, curry, and turmeric with some cold vinegar, and add this to the boiling vinegar, and let all boil for a few minutes. Bottle and cork tightly when cold. N.B.—This quantity will make from 6 to 10 bottles.

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PART 2.

Agriculture.

SEASONABLE NOTES ON POTATO CULTURE.

During the present month and part of March potato planting will be universal in the southern portion of the State, and a few notes on the subject may prove helpful to many of our returned soldiers and others who are entering for the first time on a farming life.

CULTIVATION OF THE POTATO.

BY THE EDITOR.

Next to the cereals, the potato is probably the most important food plant grown for man. It is a native of America, and was brought to England between the years 1580 and 1585 by Sir Walter Raleigh, from Virginia. It was received, however, with great disfavour; and the Church condemned it as an unholy article of diet, seeing the race and place from which it originated. It was not until the year 1805 that, by the exertions of Dr. Buchan, it became popular. In France it was quite neglected until a certain gardener, who had grown some and found no sale for them, induced one of the kings of France to wear a potato blossom as a button-hole. This at once popularised the despised potato in that kingdom. Chemically, the potato consists of starch, gluten, and woody fibre, with, of course, water. On the authority of the late John Wilson, Professor of Agriculture, Edinburgh, an 8-ton crop of potatoes, taken from 1 acre of land, removes from the soil in which the tubers were grown—of the bases of alkaline earths, 90 lb. of potash, 8 lb. of soda, 5 lb. of lime, 7 lb. of magnesia; and of acids, 34 lb. of sulphuric acid, 20 lb. of phosphoric acid, 10 lb. of hydrochloric acid—in all, 170 lb. of inorganic matter. This was for tubers alone; and, if an equal quantity were allowed for the tops, the quantity taken from the soil would be about doubled.

MANURES.

It is, therefore, evident that, to grow potatoes to perfection, the foregoing constituent elements must be present in the soil. Professor Wilson found the best results to be obtained by preparing the soil early, and applying phosphatic and potash manures some time before planting, in the proportion of about 150 lb. to the acre. At the time of planting, nitrate of soda is sown in the drills at the rate of 1 cwt. per acre, and from $\frac{1}{2}$ to $\frac{3}{4}$ cwt. at earthing-up time.

On light, poor, sandy soils, nitrogenous manures in the form of sulphate of ammonia should be supplied at the rate of from 140 lb. to 170 lb. to the acre—one-half to be used at the time of planting, and the other half at the final earthing-up.

The matter of farmyard manures in growing potatoes is a somewhat vexed question. Undoubtedly farmyard manure is good, provided that it has been properly fermented and well decomposed; but there is nothing more fatal to good results with potatoes than putting fresh manure and potato setts together, for the young plant can never force its way through the fermenting mass of decay consequent upon slow decomposition.

Some interesting experiments, made in England by Mr. E. B. Hodley, Agricultural Superintendent to the Wilts County Council, threw considerable light on the matter of the use of artificial manures. The seasons were dry ones, and therefore more favourable to farmyard manure than to artificials, the yield from its use being considerably in excess of that obtained from the heaviest dressing (12½ cwt.) of mixed artificial manures. Where nitrogen, phosphoric acid, and potash have been applied in artificials, excellent crops have been obtained; but the heaviest crop of all was 14 tons per acre as the average of four years, grown where 8 tons of farmyard manure and 4 cwt. of sulphate of ammonia per acre were applied. The complete chemical manure was applied on different plots at the rate of 4 cwt., 8 cwt., and 12 cwt., respectively. Taking the averages for the four years, the 8-cwt. dressing proved the most economical, although the 12-cwt. dressing gave a somewhat heavier yield. When any one of the three constituents of the complete manure was omitted, there was a decrease of yield. Where the nitrate was omitted, the increase resulting from the application of kainit and superphosphate was not sufficient to pay for the cost; where superphosphate was omitted, the application of nitrate and kainit gave very little profit in excess of that obtained from the unmanured plots; and, although where kainit was omitted the yield most nearly approached that obtained from the completely manured plots, yet, even in this case, the profit was less than that obtained with a cheaper dressing of complete manure.

In conducting experiments of this nature, it should be remembered that artificial or farmyard manures will not invariably produce the same results on different soils. The rich, black soils of the Darling Downs, for instance, contain certain constituents which are wanting in lighter western or coast soils. In some there may be already a sufficiency of phosphoric acid; consequently, an application of superphosphate might prove injurious. Where cultivation grounds are deficient, as most of them are, in phosphoric acid, it becomes necessary, in order to obtain a better crop, to secure support in the form of an easily soluble phosphoric acid. Bonedust is a phosphoric acid manure which gives this result; but superphosphates produce better and quicker results.

For potatoes, a fertiliser rich in potash is essential. For general purposes a good mixed fertiliser for this crop should consist of—Available phosphoric acid, 7 per cent.; potash, 11 per cent.; nitrogen, 3 per cent; 700 lb. to the acre.

Sulphate of potash is mostly employed as a source of potash for potatoes. Muriate of potash is said to give even better results than the former.

Dried blood contains, on an average, 11 to 13 per cent. of nitrogen, but it is less soluble than sulphate of ammonia and nitrate of soda. Manures containing sulphate of ammonia should not be mixed with lime, nor applied to land which has been recently limed.

The value of kainit lies in its potash, of which it contains 12 per cent. It is the cheapest of the potash manures.

Following are the results of some experiments carried out by Mr. H. C. Quodling, Director of Agriculture, when manager of Westbrook State Farm. The manures used were—

Superphosphate, at the rate of 4 cwt. per acre.

Bonedust, at the rate of 4 cwt. per acre.

Blood, at the rate of 4 cwt. per acre.

Kainit, at the rate of 4 cwt. per acre.

One plot was unmanured, and planted with cut potatoes, and in the last plot, also unmanured, the potatoes were planted whole.

Manure.	Rate per Acre.	Weight of Seed Planted.	Cut or Uncut.	Yield per Plot.	Area of each Plot.
	cwt.	lb.		lb.	acre.
Superphosphate	4	178	Cut ..	716	¼
Bonedust	4	178	" ..	704	¼
Blood	4	178	" ..	712	¼
Kainit	4	178	" ..	722	¼
Unmanured .. ..	..	178	" ..	751	¼
Unmanured .. ..	..	178	Uncut ..	708	¼

The best manure then, for potatoes, is a mixture of farmyard manure and some artificial. For instance, 16 tons of stable manure per acre will produce a larger crop than the most remunerative dressing of artificial manure; but, employ a mixture of 8 tons of stable manure and 3 cwt. of nitrate of soda, or an equivalent quantity of sulphate of ammonia, and a far greater yield will be obtained—in fact, such a dressing gives the greatest yield and the most remunerative results of any. If stable manure is unavailable, any artificial dressing for potatoes should contain nitrogen, phosphorus, and potash. Omit one of these (as has already been shown), and the result will be a poor crop. The omission of nitrogen will cause the greatest loss, and that of potash the least.

SOILS.

Of all crops grown, the potato is the one which shows the greatest content of potash in the mineral constituents withdrawn from the soil. Hence the well-known value of soil derived from granitic detritus for potato culture. In it, we have abundance of potassium silicate, derived from the decomposing felspar and slowly set free in other forms, for the uses of the plant. Where ground has been annually cropped with potatoes for many years without a rotation, it is mainly owing to the potash having been used up that the soil is not liberal in its return of tubers.

Some of our scrub soils yield a fairly good crop of tubers, but rarely over 4 tons. to the acre, and these are usually somewhat watery and bad keepers, while there is frequently an abnormal growth of tops. The best potato lands in this State are the black and red soils of the Darling Downs, notably at Allora, and, nearer the coast, at Forest Hill, Laidley, and Gatton, where an 8-ton crop is no rarity. Generally, it may be said that potatoes may be grown on any soil, but that those grown on clay soils are waxy and of bad quality; light, granitic soils produce nice, mealy potatoes; and fertile loams yield the best tubers—best both in quality and quantity.

SEED POTATOES.

When we speak of seed potatoes, we mean potato tubers which are planted, whole or cut, to produce a crop. Potato seed is a very different thing. The potato is a *Solanum*, which produces flowers and seed vessels. The latter appear in the form of a small green apple or tomato, which contains a quantity of small seeds, and it is by sowing many thousands of these seeds that new varieties are produced, in very limited numbers compared with the enormous numbers of seeds sown, by scientific growers, who make the production of new kinds of potatoes a business, and a very profitable business it has often proved to these experimenters. Here, however, I am dealing only with the tubers or so-called seed potatoes.

There is a good deal to be studied in the selection, care, and treatment of seed potatoes, and many farmers take far too little care of them. When the summer crop is dug, the small potatoes are hauled to the barn, and either left in bags till the next planting season comes round, or else in a large uncovered heap on the floor. Then, when planting time has arrived, it is considered time enough to overhaul the heap, bags, or pit, and pick out the rotten ones. Too often the seed is found in a matted condition, owing to the potatoes not having been turned. This necessitates the whole mass being stirred up—a process which breaks off the majority of the shoots. All this means loss—a loss which can easily be avoided by being careful to turn the seed over occasionally, say about once a fortnight, or, at any event, a fortnight before planting, by which a gain in growth may be brought about. New shoots will then form, and they will be up as early as those which were planted immediately after the last turning. An important point is to plant no potatoes except those which have sprouted. This was conclusively proved to be correct at the Queensland Agricultural College, when one plot was planted with sprouted, and another with unsprouted seed. The former came up uniformly with scarcely any misses, whilst the latter plot showed an irregular growth and wide vacant spaces. In trials which were carried out for the Irish Department, at sixty-seven centres in sixteen counties, there was an average increase of 2 tons per acre from sprouting, and in the four preceding seasons the increase due to sprouting ranged from 1 ton to 2 tons 13 cwt. No stronger testimony could be desired.

Now, concerning the size of seed tubers. Opinions differ as to whether small or large seed gives the best results. A trial was made in England to settle the question. Three rows of equal length and with an equal number of setts were planted with Northern Star potatoes as follows:—

Row No. 1: 38 setts, weighing 3 lb., produced 54 lb. of potatoes.

Row No. 2: 38 setts, weighing 4 lb., produced 64 lb. of potatoes.

Row No. 3: 38 setts, weighing 7 lb., produced 92 lb. of potatoes.

Assuming that the seed cost 1d. per lb. and the produce sold at 1d., we find that row 1 returned 4s. 3d.; row 2, 5s.; and row 3, 7s. 1d.—clearly a great gain in favour of the larger setts. All were planted on the same day, in equal ground, and all had the same amount of cultivation.

This leads to the subject of planting whole or cut tubers. Here again opinions differ. Some think it a waste to plant the setts whole, while others think the best results are got with uncut seed. Now, at the Guelph Farm, Michigan, U.S.A., experiments were made which lasted for four years, to decide the matter. These experiments are reliable, and emphatically show the advantage of planting good setts.

The experiments were made to test the effect of the number of eyes in the setts. The difference in the yield between those with one eye and those with five was found to be very considerable, amounting to about 28 bushels, the results being as follow:—

From 1 eye, 136.41 bushels per acre.
 From 2 eyes, 144.70 bushels per acre.
 From 3 eyes, 153.13 bushels per acre.
 From 4 eyes, 162.82 bushels per acre.
 From 5 eyes, 164.37 bushels per acre.

Up to four eyes in each sett, the increase in the field is, roughly, 9 bushels for each additional eye, so that, up to that extent, the increase in eyes would be well repaid in the field.

Against this experience, I place that of a Queensland potato-grower, Mr. James Pink, of Wellington Point. He says:—It has been the practice to select for propagation the refuse of the potato heap; small, ugly, ill-shaped tubers have been considered good enough for seed, and where the result has not come up to expectations, the cry is raised that the potato is degenerating. In carrying out this practice for years, was it possible to arrive at any other result? But the very art of gardening is to lift Nature above her normal state, by raising new and improved varieties of seed, and by selection.

The method of selection is peculiarly adapted to the principle of growing from single eyes. If we take an average good-shaped potato, weighing from 6 to 10 oz., we shall find that it has from 12 to 18 eyes, which, if cut into single eyes, would give as many setts, which would naturally produce a more even sample than the same number of whole tubers of different sizes. The principle of growing from single eyes has two great advantages—namely, economy of seed, and, upon suitable, well-tilled land, a larger crop of marketable potatoes.

When whole tubers are planted, two or three eyes start into growth first; these keep the lead during the entire growing season, and from their stolons the largest potatoes are produced. The weaker eyes start later into growth, and produce only small tubers of little value; but, when single eyes are planted, the whole strength of the sett is devoted to one growth; all the young tubers are formed nearly at the same time, and the plant, having no other calls on it for nutriment, these continue to grow and form large tubers. The whole tuber produces the largest number of potatoes, but the single eye will produce the most uniform sample and the heaviest crop per acre.

With a view to ascertain the relative productiveness of tubers and setts, a series of experiments was carried out in the gardens of the London Horticultural Society. A piece of ground was divided into 4-ft. squares, and in the centre of each square was planted either a whole tuber, or a single eye, or a sett containing three eyes on the whole surface of the tuber pared off so as to leave the eyes safe, but removing the centre—a practice not uncommon in Scotland. These were, in fact, potato peelings. If we consider the results of the whole sixteen experiments as being but one experiment, we shall find their proportions expressed by the following figures:—

Whole tuber	333.38, or 2	} nearly
Single eyes ..	..	..	..	..	717.87, or 11
Three eyes ..	..	..	..	..	613.94, or 5
Parings ..	..	..	..	..	504.69, or 4

In adopting the principle of the single-eye culture, it is requisite that the eye should be taken from large or averaged sized potatoes, for the smaller the potato the weaker its producing powers. The crown eye always grows the strongest, and produces the largest potatoes. The eyes taken from the middle of the potato produce the best-shaped and most uniform tubers.

There are several ways of cutting the potato into single eyes. The principal thing to aim at is, to obtain a fair share of flesh of the tuber to each eye, with the least amount of cut surface. Take any potato and hold it before you with the stem end down. You will notice that the eyes are arranged around the tuber in regular ascending rotation from the bottom to the top, similar to the thread of a corkscrew. Now, take a sharp thin-bladed knife and remove the first eye by placing the knife equally distant between it and the eye next in rotation above it, sloping it to the indenture left by the stem, removing the flesh with it.

When the first eye is removed, turn the potato in your hand till the next eye appears; remove this in the same manner, and keep on turning the potato, removing each eye as it appears. These setts should be planted as soon as cut, and a little hot lime thrown over them will absorb the moisture, prevent premature decay, and also the attacks of insects. The above method could, however, scarcely be adopted by a farmer

who plants large areas of potatoes. As an experiment, it is, of course, very interesting and instructive, and useful as being a simple means of increasing valuable new varieties of potatoes.

Some farmers utterly condemn the time-honoured practice of cutting up the potato into setts. One man says:—In all the trials which have been recorded of the potato crops produced from cut and uncut seed, I have never met with an instance of the cut tubers yielding the most or best. This fact must surely be generally known, and it is most surprising that it is not acted on. The process of cutting may increase the setts by about 30 per cent., but, if the time taken in cutting them, and the decreased yield be taken into consideration, no advantage whatever is secured, but the reverse. A man is far better off with a piece of land planted with 25 or even 30 cwt. of whole tubers than if it were planted with 1 ton cut up to cover the same space. If cutting the potato is done to save seed, that is a very poor reason.

In dealing with the cutting of potatoes, the large tubers are mostly cut into three pieces, the medium ones into two, and the small ones are let go whole. Plant the best and largest cut sett side by side with a whole tuber; it will invariably be found that the whole tuber produces the greatest number of potatoes, and certainly the largest ones. The difference in favour of the whole sett I have frequently found to be 2 lb. to one plant, and imagine what this means in the case of thousands or tens of thousands of plants. The scarcer and more expensive a variety is, the more it is cut; and, consequently, the worse for the crop, and productive of certain degeneration. It appears to the writer, from his own practical experience, that, if potatoes are cut into setts with at least three eyes, the result is equally as good as when the whole tubers are planted, and that in the latter case there will be a larger proportion of small potatoes.

SPROUTING SEED POTATOES BEFORE PLANTING.

This is more often practised by cultivators of gardens than on the farm, but it has some decided advantages which all potato-growers may benefit by.

Seed potatoes are often badly prepared for planting, and still more often are not prepared at all. As a rule, they are kept in heaps in the barn or in bags till they are wanted in February or in August, or in a damp shed, where it is usually found that the growths have made considerable progress. The sprouts may be 2, 3, or 4 in. in length. They grow over and amongst the tubers like a network, and the greater part of them are broken off in moving the tubers, or before they can be separated. Many have little regret in doing this. They think it is necessary, and it is; but it is also exceedingly harmful, and this ought to be remembered, as deteriorated seed is always more or less unproductive. Fancy what the result would be were we to allow our corn to sprout unduly before sowing! The excuse is that potatoes will resprout, and they will; but never so robustly as in the first instance. These long growths take a great deal out of the tuber which ought to be kept in reserve to facilitate the ordinary growth in the soil, and superfluous growth should be wholly prevented. This is easily accomplished if given timely attention, and I would urge growers that they look to their seed tubers at once.

The first treatment should consist of preventing the growths from becoming long or of a pale colour, which occurs when they are kept in the dark. Begin keeping them in the right way by turning the tubers over and removing any diseased one meets with. Do not put them in a heap again, but lay them out in a single layer on the barn floor or some other building where they will be fully exposed to the light and receive a good deal of air. This will not only check the production of long, weakly shoots, but it will green and harden the tubers, and this is a great benefit to them, as a greened tuber is much more hardy to come in contact with the soil than one that has been kept from light and air for six months or more. The growths, which will be slowly produced when laid out in a single layer and in light and air, will be short and robust and altogether different and superior to the shoots drawn up in the heap.

THE LEAST EXPENSIVE WAY.

This laying out is one way of sprouting potatoes which should be followed by every farmer who attempts potato culture. It is the least expensive way of treating them, and will always pay handsomely, as the first growth and subsequent results from prepared tubers are infinitely better than when they are taken straight from the heap and planted, which very many are, unfortunately. But there is another way of sprouting which is still better. This is to get a number of wood trays from 2 in. to 3 in. deep, and of any width and length; from 3 ft. to 4 ft. long, and 2 ft. to 3 ft. wide, are handy sizes. A little fine soil is put in the bottom, and the tubers are stood up on end as close as they can be packed in the trays. The ends with the eyes or buds on them are kept up, and the trays are placed in light, airy sheds, or such like places. Forcing them into growth is not advisable, the object being to get hardy little shoots on the tubers, which will not be checked when they come in contact with the soil in planting. The growths should not be more than 1 in. long when planted, and $\frac{1}{2}$ -in. is quite as useful a length. If trays cannot be provided for all of them, there is no

reason why the whole should not be laid out in sheds, or the early sorts may be sprouted in trays first, planted, and the trays again filled with late kinds. The right time to put them in trays is before growth begins, and many of the early ones will require attention at once. Sometimes there are blind tubers. When these are planted there is a blank, but in sprouting none but growing tubers should be planted. If it is seen that the growths are likely to exceed 1 in. in length before they can be planted, check them by admitting more air, but in doing this take care that a cold cutting wind does not reach them, and always be sure that they are protected from frost if that is occurring, as it still may. When the tubers are planted quite dormant it is often a long time before growth shows above ground. It might often be earlier without much chance of being injured by frost. Ail, too, desire their crops as early as possible if grown to meet early markets, and there is no better way of helping them on than the process of sprouting before planting, and having both tuber and growths in a sturdy, hardy condition when put in the soil. I have found this bring the crops in a fortnight or three weeks sooner at digging time than dealing with unsprouted tubers or those sprouted in the heaps, and the yield is also better from sprouted than unsprouted sets. Do not run away with the idea that there is a good deal of fiddling labour about it, and is not worth the bother, but look on it as a very important aid to successful culture and extra remunerative returns, and you will not be disappointed.

There can be no doubt that seed potatoes are weakened by the rubbing off of the shoots when they have sprouted badly, but that a good crop may be obtained from a second sprouting has often been proved. Potatoes have even been planted when every vestige of a sprout was rubbed off and not an unsprouted eye appeared, yet they sent up vigorous shoots.

FLOWERING AND SEEDING.

Under favourable conditions the potato plant flowers freely, and produces a green berry which contains the true seed of the plant. It is from these seeds that the different new kinds of potatoes are produced. I need not here go into the matter of the production of seedling potatoes, as what is intended here is merely instruction to young farmers who have had little or no experience previously in the art of successful potato-growing. The work of raising new varieties is expensive and tedious, and is only undertaken by certain growers (as I shall presently show when I come to the cross-fertilising of potatoes), who practically devote their lives to the business, sowing hundreds of thousands of seeds, to find sometimes only one new plant worth cultivating.

The potato plant does not produce seed so freely in this State as in colder climates, and it is, perhaps, as well that it does not flower heavily, since experiments on

THE EFFECT OF FLOWERING OF POTATOES,

made by a German scientist, some years ago, to ascertain whether blossoming was detrimental to the development of potato tubers, showed that the effort of the plant to provide for its reproduction by means of seeds seemed to result in a corresponding weakness in its root growth and in the size and numbers of the tubers. The experiments were carried out on a number of plots on similar soil, every condition being exactly the same. On one plot the plants were allowed to bloom as much as they liked, but the blooms of the plants in the other plots were cut off at different times. The crop that had not been topped at all was the worst yield, and the best crop was the one that had been prevented from blooming by being topped at frequent intervals. Those that were topped at the latest stage of the plants' growth were not so satisfactory as in the case of the crop frequently topped off.

[TO BE CONTINUED.]

WHITE MUSTARD.

Two species of mustard are met with in cultivation—the *brown* or *black mustard*, with brown or dark-coloured seeds, and the *white mustard*, with yellow seeds. The former is cultivated solely for its seeds: these are ground, and the flour, after admixture with a proportion of the milder and less pungent flour of the white mustard, is used for making the well-known condiment. The latter is best known as a catch-crop for sheep feed or for ploughing in as green manure, and for the production of seedlings for salad. The crop, however, is also grown extensively in some districts for its seeds, which are used in the manufacture of mustard for domestic purposes.

Prices.—At the present time brown mustard is quoted on the London market at £7 16s. to £7 18s. per qr. (448 lb.), and white mustard at 10s. per qr. less. These prices, which are much above the average for the past few years, are attributable to a number of causes, including a lessened home production due to unfavourable weather during the early stages of the growth of the crop, the stoppage of imports from the

Baltic ports, and an increased demand from America. In normal times the market for home-grown mustard is strictly limited, and any considerable extension of the area under this crop would be attended with some risk, but so long as the present conditions continue there is likely to be a good market at home with the probable continuance of a demand from abroad.

Soil and Climate.—It would be well to confine the growing of brown mustard for seed to those areas that have proved best adapted for the purpose in the past, viz., the good fenlands and marshlands of Lincolnshire, Cambridgeshire, Huntingdonshire, and Norfolk, as this crop requires a deep, moist, well-drained fertile soil, free from acidity. There is one serious drawback to the cultivation of brown mustard. The seed, especially if the crop is over-ripe, is apt to shell out at harvest and cause trouble in subsequent crops.

White mustard is adapted to a much wider range of conditions than brown mustard, both as regards soils and weather, and causes less trouble from shed seed. It can be grown more or less successfully on all kinds of land, and is a safe crop to take on freshly-ploughed grass-land, as wireworms attack it only slightly or not at all. On heavy claylands it is often taken after dead fallows, the following crop being wheat. This system invariably proves a great success, both as regards the mustard and the wheat. On heath and light lands, white mustard is taken before barley. It is said that where turnips will grow white mustard will succeed.

FOR SEED PRODUCTION.

Generally speaking white mustard may be regarded as a fallow crop, permitting the usual summer cultivations. At the present time, when every available acre should be under a useful crop of some kind, white mustard might in many cases be grown on land normally bare-fallowed.

Seed Bed.—The ground requires thorough preparation, and a fine and fairly solid seed bed is essential.

Manuring.—If the land is in good heart the only manure needed is 3 to 4 cwt. of superphosphate per acre. In other circumstances a good dressing of farmyard manure, say 10 to 15 tons per acre, should be given, in addition to the superphosphate.

Seeding.—White mustard may be drilled at any time from the first week in April to the middle of May. If it is sown earlier it runs the risk of being cut off by frost, but if the earlier sown crop is successful it has the advantage of coming to harvest before the corn harvest begins. The seed should not be buried more than half an inch, or it will not germinate evenly; it is usually drilled on the flat in rows 12 to 18 in. apart. Some growers drill 12 in. apart and chop out the plants 9 in. in the rows or, to save labour, run the horse-hoe across the crop; on good land the plants require more room to enable them to branch. If the seed-bed is sufficiently fine, half a peck of seed, or slightly less, will be ample for 1 acre.

Harvesting.—Great care should be exercised in judging the correct time to cut: if cutting takes place too early the seed will be green and shrivelled, while if it gets too ripe there is great loss through seed shelling on the land, especially in windy weather. Old growers say they wait until the colour of the pods assumes the brownish tint of a hare's back. It is advisable to cut the crop slightly on the green side and give it plenty of "field room" to enable the plant to dry out thoroughly. White mustard is generally cut by hand with sickles, and laid on the ground in small bunches; but when there is a scarcity of labour or the men are not used to this form of cutting, the ordinary corn binder does the work well. Small sheaves should be made and not tied too tightly, and the crop should be cut as high as possible so that the high stubble may form a good resting place for the sheaves. The sheaves should be turned after two or three days, and carted when thoroughly dry. In carting care must be taken to prevent loss of seed; cloths should be put over the racks or frames fixed to the carts to catch any shed seed, and this should be distributed over the stack from time to time and not laid in heaps, or the seed will turn mouldy.

Stacking.—A good staddle is necessary. This may consist of faggots or brushwood covered with straw or coarse grass, on the top of which should be placed a cloth or old bags to catch any shelled seed. The stacks should be relatively small, about 4 yards wide, to prevent over-heating. In some districts, stacking is obviated by threshing the crop in the field.

Threshing.—This is done with the usual tackle, the only extra parts required being four sieves of smaller size than those in normal use; such sieves can usually be supplied by the makers of the threshing machines.

Yield.—The yield varies very greatly. It may be as much as 40 bushels, but normally runs about 16 to 20 bushels, or a little more, per acre.

The chaff (pods) is used for feeding, but the straw is practically of no value for fodder, but may be used for the bottoms of stacks and cattle yards, and in some parts to form shelter walls around open cattle sheds.

FOR CATCH CROPPING.

As a catch crop for forage, mustard has many points in its favour. It grows very quickly and yields a large amount—from 10 to 14 tons per acre—of nutritious green food suitable for sheep feeding. Under favourable conditions it will often reach a height of 3 ft. or more and be ready for folding in six to eight weeks from the time of sowing. Thus it enables land to be occupied profitably even when only a short interval occurs between two ordinary rotational crops, *e.g.*, after vetches, peas, or early potatoes, and in cases where the turnip crop has failed.

When sown in *May, June, or July, from $\frac{1}{2}$ peck to 1 peck of seed should be drilled in rows 12 to 18 in. apart. Drilling gives an opportunity for keeping down weeds and for stirring the land. Later in the season when weeds have not the same chance of coming to maturity, *e.g.*, after a corn crop, the seed may be sown broadcast on a lightly ploughed furrow and harrowed in; from 18 to 20 lb. of seed per acre should be sown under these conditions.

The crop should be fed off before flowering, while it is still succulent, as the plants become fibrous and hard as maturity is reached. In feeding off, it is desirable to give some other food of a drier nature at the same time, or to run the sheep on stubbles or old pasture before turning them on to a fresh "break."

FOR GREEN MANURE.

Mustard is often grown for ploughing in as green manure. This practice is specially to be commended for soils in poor condition when the supply of farmyard manure is inadequate. A ribbed roller, run over the crop prior to ploughing, facilitates covering and, by bruising the plant, helps to promote decomposition. In addition to increasing the store of organic matter and thereby improving the water-holding capacity of light soils, a mustard crop when ploughed in helps to keep strong soils open, promotes aeration and drainage, and thus improves their texture.

After ploughing in mustard on the lighter soils it is desirable to consolidate the ground by rolling.—Board of Agriculture and Fisheries, Whitehall Place, London, S.W.

THE COTTON OUTLOOK FOR 1918.

Up to the end of last year, the American and Liverpool cotton markets continued firm, and the trend of values was upward. Advices from America concerning the crop were not satisfactory, for killing frosts had been experienced in Texas, damaging the late cotton, and rains in the Eastern and Central divisions had delayed picking and the movement of the crop. Few farmers, except in Texas, were holding for higher prices. In the latter section they were holding for 30 to 40 cents (1s. 3d. to 1s. 8d.) per lb.

Whether rightly or wrongly, there is a growing belief in the American cotton districts that the most serious problem for the world will be the question of food supplies, and so pronounced will this become that even with the end of the war for one or two years small cotton crops from America will continue the rule. For delivery in January, 1918, prices closed at 21.13d. against 20.03d. a week earlier. British spinners continue to complain of the high prices they are compelled to pay for spot cotton, and assert that they have to pay, practically, any price demanded, and that conditions in the cotton trade are not much worse, is attributable to the successful work of our navy. The "Memphis Commercial Appeal" estimates the frost damage at 1,171,000 bales, and that in a single month the crop had deteriorated 5.9 per cent., and cotton was being marketed as fast as gathered and ginned.

It is significant that the American yield per acre last season was 156.6 lb.; in 1915-16, 170.3 lb.; and in 1914-15, 209.2 lb.

The average estimates indicate a total crop of 11,500,000 to 12,000,000 bales, and some planters are holding for 50 cents (2s. 1d.) per lb.

Seeing that after the war there will be a serious falling off in the cotton crops of America, owing, as stated, to the imperious demand for foodstuffs, and furthermore, considering that oversea transport will be resumed, there is every prospect that the golden era of the years from 1866 to 1873, when cotton-growing promised to become a permanent and paying industry in Queensland, will return, and that possibly cotton-growing will become as important an industry in this State as in the United States of America. The Queensland grower has happily not to contend with any terrible

* August, September, or October in Queensland.

destructive pest, like the boll weevil and cotton stainer, so ruinous to the American grower. Neither has he to fear destructive early frosts, even in the South. His returns are also much larger per acre. As above shown, the highest yield of ginned cotton per acre in America was a little over 209 lb. in 1914-15, while the average for three years was about 178 lb. If our growers, by good cultivation, can raise, as they have done, from 1,000 lb. to 2,000 lb. of seed cotton per acre, this, at 300 lb. of clean lint per 1,000 lb., would yield from 300 to 600 lb., or an average of 450 lb. lint as against the American average of 178 lb. Is it not worth while to once more enter in earnest on cotton-growing, and to do so in the coming season, so as to take full advantage of the inevitable high prices to come, as indicated above? The Department of Agriculture has been, and always will be, in sympathy with the cotton-growers, affording them every facility by supplying reliable seed, making advances on the crop, and taking the whole business of ginning and marketing, returning all profits to the growers. The department also distributes a pamphlet dealing exhaustively with all phases of the industry, and which is constantly kept up to date.

MARKET GARDENING.

POSSIBILITIES IN MINT.

A few years ago there was a certain amount of activity shown on the question of mint-growing being a good investment. This was taken up by a few, but, on the whole, the interest did not live for very long. Now is the time to revive it, for it provides an opportunity of attacking Germany, as before the war a great deal of the mint sold with packets of dried peas came from that country. Why not let Australia step in here? The work is simple enough. Mint grows easily in a favourable soil and multiplies rapidly. In picking it, care must be taken not to bruise the leaves, for mint bruises easily. This will not show clearly till the leaves are dried; then they turn black, and naturally must be thrown on one side as useless. To dry it, hang the mint up in sprigs from a ceiling where there is a good draught and no moisture. The simplicity of the whole operation should appeal to anyone who does not care for hard work, and yet wishes to eke out a few extra pennies.—“Town and Country.”

BEES AND GRAPES.

Referring to a rumour that an ordinance prohibiting the keeping of bees within the city of Jerseyville, Illinois, U.S.A., was to be passed by the City Council, a correspondent of the “American Bee Journal,” in denouncing the proposal, which, by the way, arose from a statement that bees were ruining the grape crops, made the following statements:—

1. Bees cannot sting grapes. If they did, it would poison the grapes, and they would be killed by their own devices.
2. Bees cannot puncture grapes in any way. You can test this to your own satisfaction by placing a bunch of sound grapes within a hive of bees. You will find that the grapes have been untouched. If you puncture or crush one of the berries the bees will consume the juices.
3. The damage done to grapes is done by birds at daylight, before sunrise. The bees come afterwards, and gather what would otherwise be lost, for grapes that have been picked by birds will not keep.
4. Even if bees could puncture grapes, and did so, an ordinance forbidding the keeping of them within city limits would be of no avail, for bees can fly for a mile or more, and usually fly half a mile, in search of food.

No ordinance was passed.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
F. C. G. Gratton ..	"Towlestone," Kingsthorpe	2	14	Holstein Cattle Club Herd Book
T. Mullen	"Norwood," Chelmer	3	20	Queensland Jersey Herd Book
J. H. Paten	Yandina	6	21	Ayrshire Herd Book of Queensland
Queensland Agricultural College	Gatton	4	38	Ayrshire Herd Book of Queensland
		..	2	Ayrshire Herd Book of Scotland
		2	9	Holstein-Friesian Herd Book of Australia
		2	31	Jersey Herd Book of Queensland
J. W. Paten	Wanora, Ipswich ..	10	42	Ayrshire Herd Book of Queensland
M. W. Doyle	Moggill	4	12	Queensland Jersey Herd Book
G. A. Buss	Bundaberg	1	15	Herd Book of the Jersey Cattle Society of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Milking Shorthorn Herd Book of Queensland
M. F. and R. C. Ramsay	Talgai, Clifton ..	5	27	Herd Book of the Jersey Cattle Society of Queensland
George Newman ..	Wyreema	9	37	Holstein-Friesian Herd Book of Australia
R. Conochie	Brooklands, Tingoor	9	21	Queensland Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
W. J. Barnes	Cedar Grove	10	37	Queensland Jersey Herd Book
T. B. Murray-Prior ..	Maroon, Boonah	2	37	Queensland Shorthorn and Australian Herd Books
W. J. Affleck	Grasmere, N. Pine	6	31	Queensland Jersey Herd Book
A. J. McConnel	Dugandan, Boonah	19	36	Australian Hereford Herd Book
A. Pickels	Blackland's Stud Farm, Wondai	4	62	Illawarra Dairy Cattle Herd Book of Queensland
G. C. Clark	East Talgai, Ellinthorpe	3	7	New Zealand Herd Book
H. D. B. Cox	Sydney (entered brother's name)	3	16	Commonwealth Standard Jersey Herd Book
J. T. Perrett and Son ..	Coolabunia	2	36	Illawarra Herd Book of Queensland
State Farm	Kairi	4	8	Ayrshire Herd Book of Queensland
		1	2	Holstein-Friesian Herd Book of Australia
E. M. Lumley Hill	Bellevue House, Bellevue	45	127	Australian Hereford Herd Book
W. T. Savage	Ramsay	2	22	Illawarra Herd Book of Queensland
Tindal and Son	Gunyan, Inglewood	50	400	Australian Hereford Herd Book
J. N. Waugh and Son ..	Prairie Lawn, Nobby	3	28	Queensland Jersey Herd Book
J. H. Fairfax	Marinya, Cambooya (2)	9	55	Ayrshire Herd Book of Queensland
C. E. McDougall	Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
J. Holmes	"Longlands," Pittsworth	6	20	Ayrshire Herd Book of Queensland
P. Biddles	Home Park, Netherby	1	20	Illawarra Dairy Cattle Association
A. Rodgers	Torran's Vale, Lane-field	1	9	Milking Shorthorn Herd Book
R. S. Alexander	Glenlomond Farm, Coolumboola	1	..	Holstein-Friesian Herd Book of Queensland
		2	..	Holstein-Friesian Herd Book of Australia
State Farm	Warren	3	83	Ayrshire Herd Book of Queensland
S. H. Hosking	Toogooloowah	2	15	Holstein Cattle Club Herd Book
W. J. H. Austin	Hadleigh Jersey Herd, Boonah	1	2	Queensland Jersey Herd Book
Ditto	ditto .. ..	..	6	Commonwealth Standard Herd Book
H. M. Hart	Glen Heath Stud, Yalangur	7	21	Ayrshire Herd Book of Queensland
C. Behrendorff	Inavale Stud Farm, Boonah	3	9	Holstein-Friesian Herd Book of Queensland
F. A. Stimpson	Ayrshire Stud Farm, Fairfield, South Brisbane	25	77	Ayrshire Herd Book of Queensland
M. L. Cochrane	Paringa Farm, near Cairns	5	21	Ayrshire Herd Book of Australia

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
Albert Cook	"Greenmount," Mackay	1	8	A.-A. Stud Book, New Zealand
Thomas Brown	"Bellgrove," Kingaroy	1	14	Do.
Higgins Bros.	Sandy Creek, Leslie, Q.	6	2	Do.
Calcino Bros.	"Summariva," Charleville	3	4	Do.
W. M. McKelvie	"Undulla," Miles ..	5	4	Do.
James Connors	"Glen Erin," Nanango	1	2	Do.
J. A. Mackintosh	"Yundah," Warwick	2	8	Do.
M. J. Luff	Kaimkillenbun	1	1	Do.
A. Spencer	Brisbane	2	1	Do.
Beak Pastoral Co.	Rockhampton	2	10	Do.
E. Swayne, M.L.A.	West Plane Creek ..	1	2	Holstein-Friesian Herd Book of Queensland
Godfrey Morgan	"Arubial," Condamine	3	6	Queensland Shorthorn Herd Book

A NATURAL REMEDY FOR WORMS AND BLOOD DISEASES IN STOCK.

By L. G. JONES (late 2nd Lieut., 41st Battalion, A.I.F.).

The attention of stockbreeders, pastoralists, and farmers is directed to the following article under the above heading:—

Sheep eating earth at certain spots was one of the first things I noticed when I came over from Tasmania to the main land (Burrowa district, New South Wales), and everybody I spoke to in the district replied: "Oh, that is where there is a salty soakage, or where at some period or other salt has been thrown on the ground for the stock to lick, as was the custom on some stations in olden days, and has been washed into the ground by rains." Not being satisfied, I gave the subject more consideration, and further studied the positions of the lickholes (by which term they were generally known to sheep men), which brought me to the conclusion that, if they contained salt in sufficient quantity to cause sheep to lick at them, it must be a natural soakage and was not through salt being tipped there in days gone by, as the positions and localities in many instances flatly contradicted it. The next peculiarity I noticed was that these lickholes ran reef-like across country, as would a lode of silver or other mineral, and would be cut, perhaps, by a creek or come to the surface on a flat when the sheep would lick or burrow for the earth as the case might be, and in no case could I detect any saline taste in the earth. I felt convinced that the salt idea was a hypothesis and not a fact. At this stage I decided to have an analysis made, and which is now herewith attached:—

ANALYSIS OF LICKHOLE.

	Per cent.
Moisture	3.85
*A volatile and organic	4.20
Insoluble silica	80.20
Soluble silica SiO_2 .. .. .	.28
Ferric oxide Fe_2O_3	7.10
Ferrous oxide FeO	trace
Alumina Al_2O_3	3.11
Lime CaO} .. .. .	.63
Magnesia MgO} .. .. .	.49
Potash K_2O} .. .. .	.11
Phosphoric acid P_2O_5 .. .. .	.37
Sulphates SO_3 .. .. .	.17
Chlorine, equivalent to sodium chloride .. .. .	.87
	<hr/>
	101.38

*Containing: Nitrogen = .08 per cent., equivalent to ammonia = .09 per cent; alkalinity or sodium carbonate = .21 per cent.

Whilst waiting for the analysis of the lickhole I put salt into their troughs and allowed the sheep free access to it, and I observed that they partook of the salt, but it did not lessen their visits to the lickhole. This, to me, was conclusive proof that the sheep did not go to the lickholes because they wanted salt. And this conclusion was further substantiated on arrival of the analysis of the lickhole. Then, why did they eat the earth? It is an old truism that there is never effect without a cause. I maintained—and do so now—that the sheep ate it by instinct, because it was beneficial to them. I further experimented with this earth by mixing a quantity of it with salt, letting some 200 very weak and wormy and flukey sheep have free access to it in a paddock where there was no lickhole, and I concluded that the sheep did improve and the deaths decreased, and I could not attribute the improvement to any other cause than the lickhole earth. After due consideration I concluded that this was the starting point of a discovery of something that would result in a benefit to stock—particularly sheep—because the analysis proved that the sheep were eating a well-defined though weak combination of chemicals. It now occurred to me that the formulae of the lickhole resembled an iron ore in composition; then, again, my experience contributed the fact that ironstone localities were sounder than other country, such as sandstone country. There seemed to me to be a connection here: I obtained about 10 lb. of the most likely looking ironstone I could find, powdered it as finely as possible, mixed it 1 to 4 with Liverpool salt, then selected twenty-five very wormy sheep showing bottle-jaw and other symptoms of disease, and allowed them to have free access to the mixture. They showed a very sharp improvement towards health. In about three weeks the skins and eyes were showing a good healthy colour, the bottle-jaw had left them, and they gradually improved in health. (Before treatment they could not have been in a worse condition.) Later, they got into condition fit to kill for rations. I killed one. There were still a good many worms in the stomach (small red), but the animal had wonderfully improved in blood condition. In fact, it was in a very healthy condition, and plenty of it. There was no doubt that the sheep had made a very large quantity of blood, and, considering that I had no guarantee that the ironstone used was of the best quality (no analysis was made), I was very pleased with the result,

because it showed an improvement on the ore over the lickhole earth, and a connection between the two ores or deposits was established; consequently, the paddock that I obtained this ironstone from had the reputation of being the only sound paddock in that part of the district, and the overseer told me himself that he never had sheep die in it, though he had at times put very flukey and wormy sheep in it, and they always benefited by the change. In this paddock there was an ironstone hill, and I put it under close observation in the following manner:—In the early morning sheep always move off from their camping ground in an easterly direction. Knowing this, I would frequently secrete myself on this ironstone hill and, with the aid of a pair of field-glasses, observe the habits of the sheep. Time and again I observed that the sheep licked the iron dust from the stones, and repeatedly they would turn the smaller and loose stones over with their nose apparently for no other purpose than to get any iron dust that might be there; and after a general study of this paddock I was—and am now—convinced that the run owed its good reputation to the available iron dust the rocks contained. At this stage I reluctantly left it, and have not had any further *practical* experience with it. But I fairly, squarely, and honestly believe that, if the principle is followed as far as it takes me—*i.e.*, if the following ores (iron and mispickel) are taken and finely powdered and mixed 1 to 4, and the whole mixed 1 to 4 with Liverpool salt, and the stock given free access to it in their troughs—we would have done with many diseases in sheep and cattle. I believe that animals treated with this mixture would live according to nature in the highest and finest sense. By virtue of the first-rate general tonic and building-up properties of these ores, which would keep sheep in a perfectly healthy condition, stock treated with it should certainly improve in condition and be proof against diseases that might otherwise attack them. With regard to cattle, it would give grown stock the same resisting power against tick fever that a young calf always enjoys without the diminishing degree. The reason for this degree of immunity (in the calf) is that power to manufacture fresh red blood cells is very great in young animals, and the destruction of these cells caused by the organisms of tick fever is not greater than the young animal's vital power can cope with. As regards the arsenic contained in mispickel ore, it being in chemical combination with the iron (principally) ensures its perfect distribution throughout the whole, and in the proportion in which it is present there is not the slightest danger in its administration, and being present principally as arsenate of iron it is gradually absorbed in the stomach without irritation. The value of arsenical treatment for worms in sheep needs no comment by me, being so well known.

ANALYSIS OF CRUDE IRON ORE.

	Per cent.
Ferric oxide	42.33
Manganese oxide .. .. .	.95
Lime	7.44
Potash .. .. .	.27
Carbon dioxide .. .. .	.12
Ferrous oxide	29.92
Alumina	7.86
Magnesia	3.82
Silica	5.82
Phosphoric acid	1.86

ANALYSIS OF MISPICKEL ORE (ARSENICAL PYRITES).

	Per cent.
Arsenic	25.60
Ferrous oxide	50.27
Sulphur	15.09
Silica	7.15
Copper	traces

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, DECEMBER, 1917.

The past month has been characterised by continuous rain, and conditions have not been in favour of high egg production. The total number of eggs laid for the month was 8,091. In the light brood section, E. Chester's pen laid the highest monthly total of 154 eggs, and in the heavy breed section the pen of the Mars Poultry Farm lead with a total of 138. The following are the individual returns:—

Competitors.	Breed.	Dec.	Total.
LIGHT BREEDS.			
E. Chester	White Leghorns ...	154	1,240
G. Chester	Do.	115	1,082
*J. M. Manson	Do.	137	1,078
*G. H. Turner	Do.	111	1,069
F. W. Leney	Do.	125	1,067
Oaklands Poultry Farm ...	Do.	135	1,060
W. Becker... ..	Do.	122	1,058
W. R. Crust	Do.	127	1,050
Kelvin Poultry Farm ...	Do.	109	1,018
T. A. Pettigrove, Victoria	Do.	112	1,008
T. Taylor	Do.	124	1,008
*A. T. Coomber	Do.	127	1,001
*J. R. Wilson	Do.	130	999
Chris. Porter	Do.	87	996
*J. Zahl	Do.	113	993
Moritz Bros., S.A. ...	Do.	105	988
D. Fulton	Do.	128	982
Quinn's Post Poultry Farm	Do.	105	959
*Mrs. J. D. R. Munro ...	Do.	118	953
A. Shillig	Do.	92	944
J. G. Ritcher	Do.	110	935
*Dixie Egg Plant	Do.	116	935
A. H. Padman, S.A. ...	Do.	102	927
T. B. Hawkins	Do.	105	925
J. L. Newton	Do.	110	913
*T. Fanning	Do.	103	908
Mars Poultry Farm ...	Do.	103	903
*A. W. Bailey	Do.	110	901
F. Clayton, N.S.W. ...	Do.	125	900
Mrs. Bradburn, N.S.W. ...	Do.	122	899
C. Knoblauch	Do.	123	891
J. Holmes	Do.	125	883
Mrs. S. J. Sears	Do.	126	880
E. Cross	Do.	128	877
G. J. White	Do.	128	873
C. H. Singer	Do.	127	866
L. G. Innes	Do.	107	864
C. P. Buchanan	Do.	120	861
R. Holmes	Do.	81	857
S. C. Chapman	Brown Leghorns... ..	110	854
G. Howard	White Leghorns... ..	88	848
Geo. Williams	Do.	103	848

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Dec.	Total.
LIGHT BREEDS— <i>continued.</i>			
J. Ferguson	White Leghorns ...	119	841
*A. E. Walters	Do.	102	836
Miss M. Hintz	Do.	119	822
Mrs. J. Carruthers	Do.	113	801
*C. C. Dennis	Do.	33	785
*Dr. E. C. Jennings	Do.	108	768
HEAVY BREEDS.			
*R. Burns	Black Orpingtons ...	132	1,159
*Mars Poultry Farm	Do.	138	1,083
W. Smith	Do.	110	1,051
E. A. Walters	Do.	119	1,036
*E. F. Dennis	Do.	114	971
W. S. Hanson, N.S.W.	Do.	98	959
F. A. Claussen	Rhode Island Reds ...	99	940
*E. A. Smith	Black Orpingtons ...	112	897
Mrs. J. H. Jobling, N.S.W.	Do.	99	896
H. Jobling, N.S.W.	Do.	110	878
D. Kenway	Do.	102	875
Cowan Bros., N.S.W.	Do.	94	865
P. C. McDonnell	Do.	85	854
King and Watson, N.S.W.	Do.	106	821
C. B. Bertelsmeier, S.A.	Do.	110	816
*Miss M. Hintz	Do.	97	815
*Oakland Poultry Farm	Do.	94	811
R. Burns	S. L. Wyandottes ...	106	790
E. Morris	Black Orpingtons ...	106	786
J. M. Manson	Do.	115	783
*Kelvin Poultry Farm	Plymouth Rocks ...	101	742
C. C. Dennis	White Wyandottes ...	88	729
*F. W. Leney	Rhode Island Reds ...	79	653
F. Clayton, N.S.W.	Do.	58	633
Totals ... ..	...	7,914	65,797

* Indicates that the birds are engaged in single hen test.

DETAILS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
J. M. Manson	180	187	157	173	179	202	1,078
G. H. Turner	149	158	194	199	170	199	1,069
A. T. Coomber	174	113	193	178	176	167	1,001
J. B. Wilson	184	165	163	179	143	165	999
J. Zahl	190	110	197	119	205	172	993
Mrs. Munro	203	151	138	150	126	185	953
Dixie Egg Plant	145	183	175	181	175	76	935
T. Fanning	126	162	173	143	129	175	908
A. W. Bailey	36	160	181	180	173	171	901
A. E. Walters	115	120	139	166	145	151	836
C. C. Dennis	156	89	77	148	153	162	785
Dr. Jennings	101	95	144	141	172	122	775

EGG-LAYING COMPETITION—continued.
DETAILS OF SINGLE HEN PENS—continued.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
HEAVY BREEDS.							
R. Burns	169	148	210	158	214	260	1,159
Mars Poultry Farm	169	199	173	180	187	175	1,083
E. F. Dennis	195	176	166	206	192	36	971
E. A. Smith	151	149	112	178	156	151	897
Miss M. Hintz	141	122	119	149	149	135	815
Oaklands Poultry Farm... ..	189	121	108	103	179	111	811
Kelvin Poultry Farm	114	115	124	170	88	131	742
F. W. Leney	111	126	91	103	114	108	653

POULTRY HOUSES.

The following notes on the construction of chicken houses, with the illustrations, are taken from a very instructive circular prepared by Ross M. Sherwood, specialist in poultry husbandry and head of the Department of Poultry Husbandry during 1916-1917, Kansas (U.S.A.), State Agricultural College:—

SIZE OF THE HOUSE.

The size of the house is governed largely by the breed of fowls, the amount of protection provided outside the chicken house, and the section of the state in which

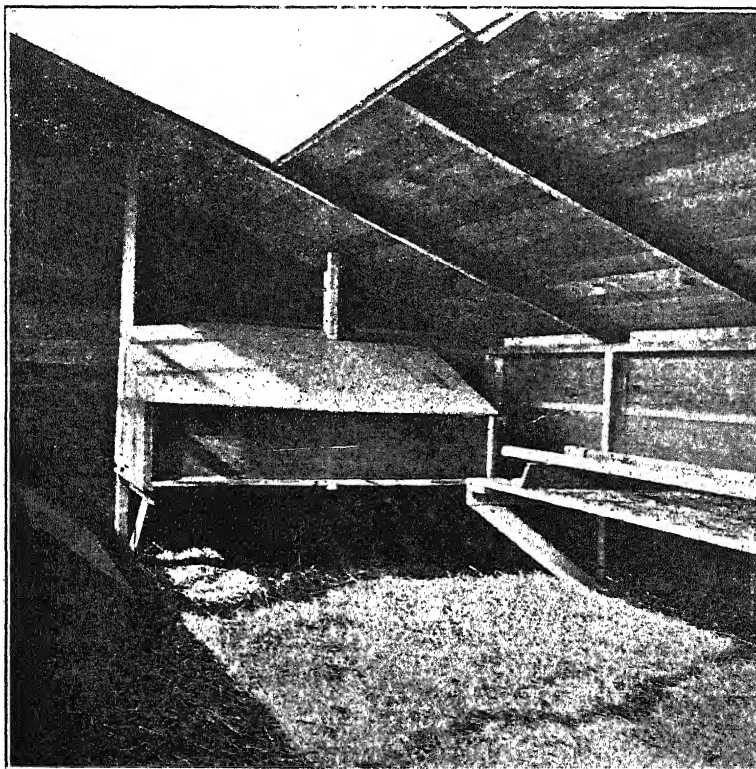


Fig. 1.—Interior of house, showing arrangement of perches above the dropping board, and nests at the end of the house.

the farm is located. The farmers of Kansas who get the most winter eggs provide a scratching room where the hens are given grain feed in a deep litter of straw or similar material. The fowls are kept in this room whenever the weather is not satisfactory for them to run at large. This scratching room should allow from three to five square feet of floor space for each hen. Heavy breeds, and fowls confined a great part of the time, require the larger space, while those which range most of the time may have the smaller floor space. Crowding of fowls does not give satisfactory results. Another room may be used for roosting, or a dropping board may be placed in the scratching room about thirty inches above the floor, and the perches placed six or eight inches above it, as shown in Fig. 1. This is an economical plan, because it eliminates the necessity of providing a separate roosting room.

VENTILATION.

There is no best method of providing ventilation. The two methods most common in Kansas are the curtain front and the open front. The open front is giving excellent results in some sections of the State, but many people find it desirable to have curtains that may be placed over most of the openings during bad weather. It has been found that a house closed on three sides and curtained tightly on the south does not provide enough fresh air. To remedy this, a narrow opening is often provided along the south side of the house just under the rafters. This causes a greater circulation of air than the curtained openings alone, yet does not allow the wind to blow on the fowls. The large curtained openings should be from thirty to thirty-six inches from the floor, so that the wind will not blow on the fowls when the curtains are raised. During the summer months other openings are necessary to make the building cool enough so that the fowls will roost there. These should be so located at the back of the house that draughts will not blow on the fowls during the night. These openings should be closed tightly during the winter months.

FLOORS.

Floors of portable houses are necessarily made of wood. For permanent houses, however, concrete and building-tile floors are coming rapidly into favour. Such floors are easily cleaned, rat proof, long lived, and practically as cheap as board floors. If properly constructed and well littered with straw, they are not cold or damp. If concrete floors are built, the moisture may be kept down by the use of a coarse rock floor foundation, as shown in Fig. 2.

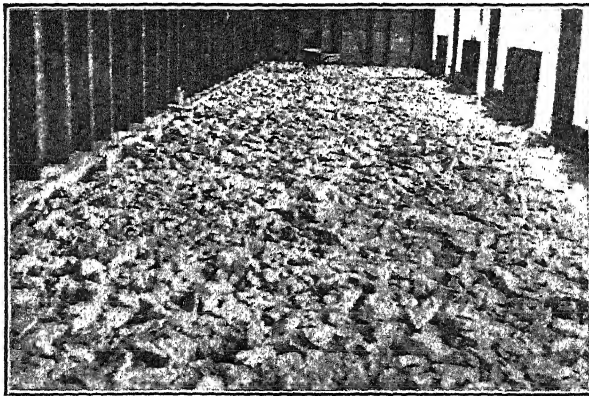


Fig. 2.—Rock foundation for cement floor. This prevents the moisture from coming up from the soil below. A floor on such a foundation should be dry.

FIXTURES.

Poultry-house fixtures should be simple, few in number, and easily removed. They usually consist of a perch, with or without a dropping board, nests, a feeding shelf, and a broody coop.

The perches should provide six to eight inches of room for each fowl, and be fourteen inches apart. Overcrowding will very likely result in an epidemic of colds or roup. All perches should be on the same level, to avoid the crowding that results from the effort of all to roost on the top perch. The most common material used for perches is 2 in. by 3 in. lumber. This may be placed on edge and the upper edges rounded to avoid bruising the feet.

If it is desired to place nests under the perches or provide more space for scratching, a dropping board should be used. This should be made of good matched material, so that there will be a minimum of cracks for harbouring mites. It should be removable, so that the ends may be easily sprayed.

A nest should be roomy, easily cleaned and sprayed, dark, and conveniently located. For most fowls a nest fourteen inches square and six inches deep is a good size. There should be one nest for every five hens in a farm flock of ordinary size. Hens are quite likely to roost on the edges of the nests during the molting season,

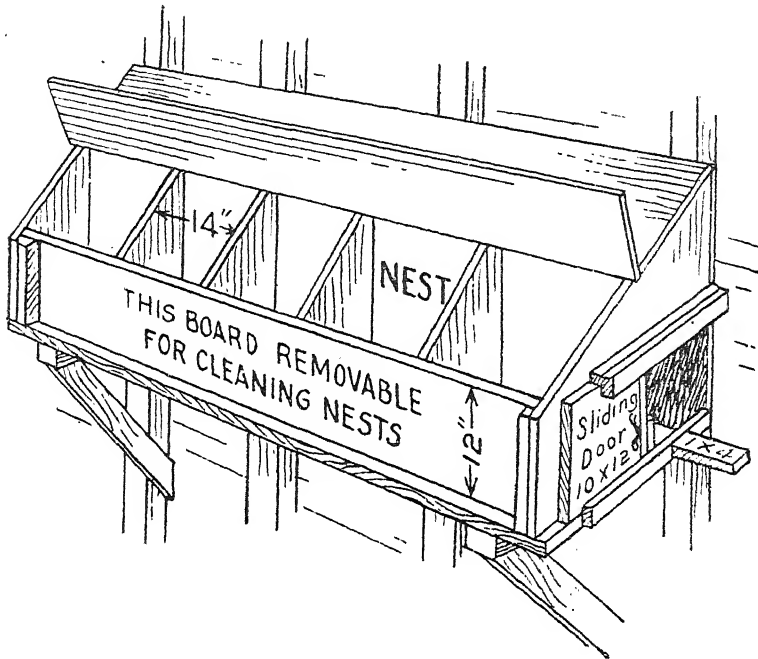


Fig. 3.—A good type of wall nest.

owing to the fact that their bodies are tender from the growing feathers and they try to escape the crowded perch. It is a great advantage to be able to close the nests at the time of the evening feeding. This may be accomplished by means of a slide door, as shown in Fig. 3.

A feeding shelf may be constructed to keep the feed hopper and water pan up out of the way of the floor litter as it is scratched about by the flock. A dry-mash

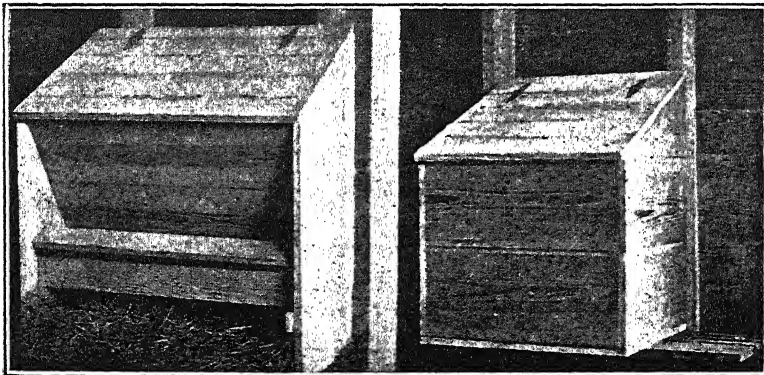


Fig. 4.—Mash hopper to left. Grain bin to right.

hopper and grain bin, as shown in Fig. 4, are very useful in the chicken house. The bin makes it possible to have a supply of grain near at hand.

A broody coop is a convenience in every chicken house for breaking up broody hens. It should be provided with a slatted bottom, so that it will be self-cleaning and there can be no accumulation of nesting material.

CARING FOR THE CHICKEN HOUSE.

The chicken house should be littered at all times with straw eight to twelve inches deep. This should be renewed whenever it becomes damp, badly broken up, or so full of droppings that grains thrown down are not quickly lost from sight.

When a dropping board is used it should be cleaned at least once a week, because disease germs and mites accumulate on it. Further, if not cleaned frequently the feet of the birds become soiled, causing a large per cent. of dirty eggs. Also, injurious gases are given off by the decaying manure.

As a matter of precaution against disease and insects, the chicken house should be thoroughly cleaned at least once a year, and soaked in every part with a 3 per cent. mixture of compound solution of cresol or a good stock dip.

The two most common poultry parasites are mites and lice. Mites are usually first noticed on the under side of the perches or in the corners of the nests where they live, rather than on the fowl's body. They stay on the body of the fowl only long enough to feed. Mites are killed by spraying. In order to get entirely rid of them it is necessary to spray two or three times to kill the mites which have hatched after the previous spraying. In warm weather the sprayings should follow each other at intervals of five to seven days. If it is cool, ten days will be sufficient.

The chicken louse spends most of its life on the fowl, and is thus not affected by cleaning or spraying. It is controlled by dust baths, dust powders, and blue ointment. A good, cheap lice powder can be made by mixing three parts of gasoline with one part of cresol, and gradually stirring in plaster of paris or building cement to take up the moisture. After drying, this mixture is ready for applying to mature fowls. It should be applied thoroughly.

Blue ointment may be purchased from a drug store and mixed with equal parts of vaseline. A piece of the mixture about the size of a pea should be thoroughly rubbed into the fluff of each fowl, close to the vent. A second application should be made eight or ten days later to kill the lice which hatch after the first application.

A whitewash is also good in keeping parasites and disease in check. A good whitewash is made as follows:—Slack one bushel of lime in a container, and add water until twelve gallons have been used. In another vessel dissolve 2 lb. salt and 1 lb. of sulphate of zinc in two gallons of water. After these are dissolved add the mixture and two gallons of sweet skimmed milk to the lime water.

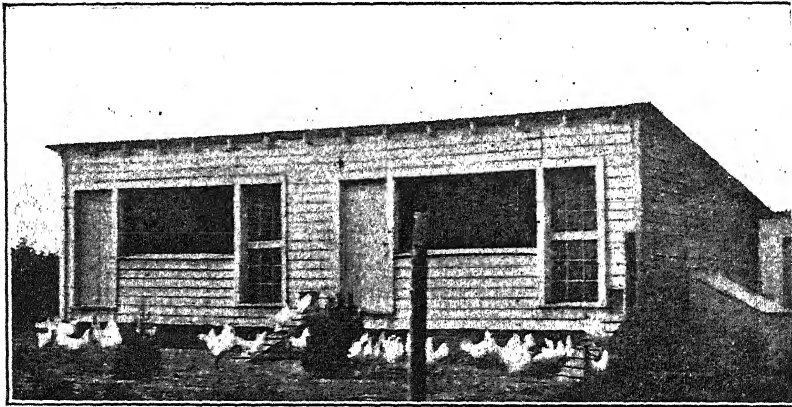


Fig. 5.—Shed-roof chicken house having good light and ventilation.

Fig. 5 shows the wall construction and front ventilation of a shed-roof chicken house. The openings in the front have muslin curtains, which may be closed in severe weather. There are openings on the back side, just below the roof, for use during the summer time. These are so arranged that draughts do not blow on the fowls. Doors are shown above the front openings. These may be used if it is found necessary.

The floor plan of this house is shown in Fig. 6. This gives the arrangement of nests, roosts over dropping board, broody coop to confine broody hens, and platform for mash hopper and water bucket.

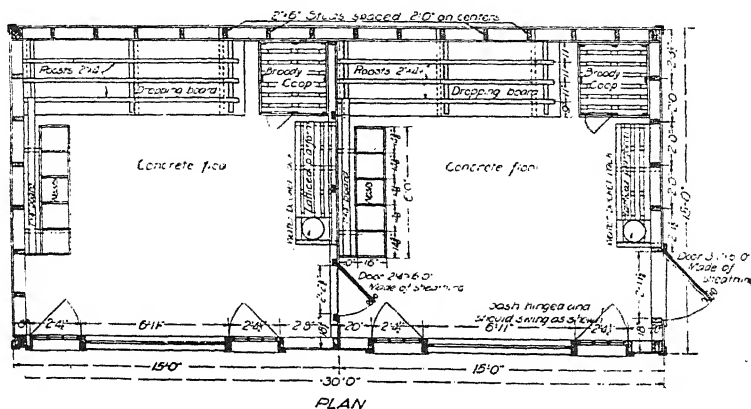


Fig. 6.—Floor plan of house shown in Fig. 5.

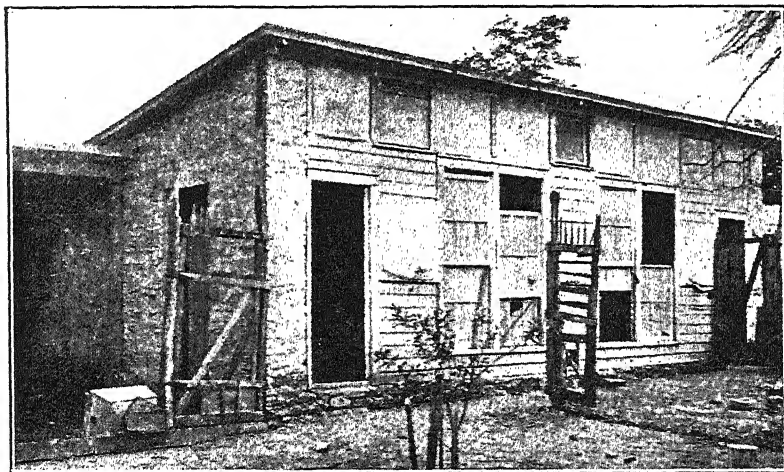


Fig. 7.—Stone chicken house which is giving good results on a Kansas farm.

The shed-roof house shown in Fig. 7 is giving good results on a farm in northern Kansas. Originally this house was much narrower, an addition being made later. Had the entire house been built at one time it probably would have been made lower. As it is, it is higher than is necessary, both in the front and in the back. This house is well ventilated, as indicated by the large number of openings. The openings in the upper part of the front form an outlet for all bad air which may accumulate near the roof.

Fig. 8 shows a Kansas farmer's well-proportioned shed-roof chicken house. The openings in the front have muslin curtains, which may be lowered whenever the weather is severe enough to make it advisable. In this house the fowls roost along the back wall over dropping boards. The nests are similar to those shown in Fig. 3, except that they are two tiers high. They are built on both ends and on the partition,

which divides the house into two similar rooms. There is a room on one end of the house for the storage of feed. Such a room is very useful because it saves a great deal of time in feeding the fowls.

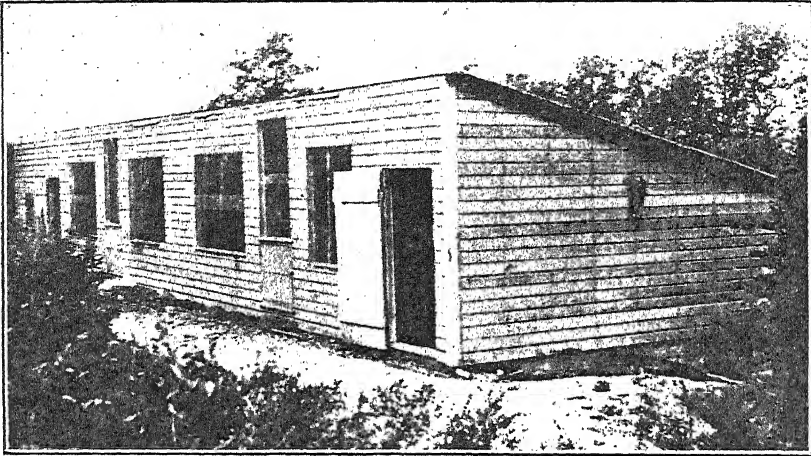


Fig. 8.—The ventilation is not overlooked in this house. The openings may be covered with curtains if weather demands.

The type of house illustrated in Fig. 9 is satisfactory when built about twenty feet wide. This house has an open front, with no curtains for protection. It has been used with good results in States farther north than Kansas for the medium-

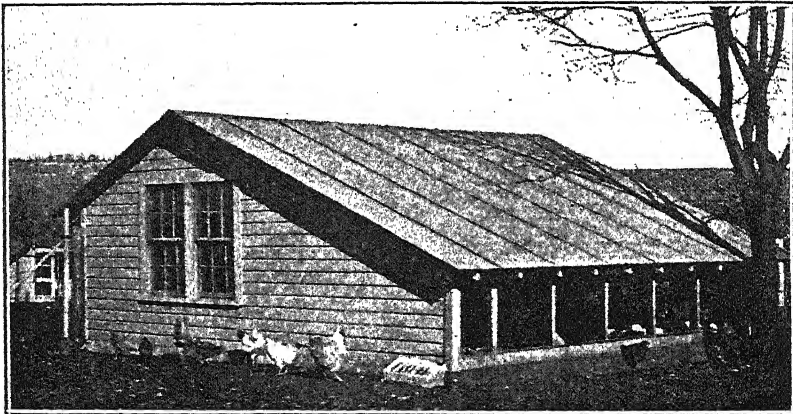


Fig. 9.—An open front hen house which is giving good results.

weight breeds. This house has windows on both the east and the west. It also has an opening along the north side, under the eaves, to provide summer ventilation.

The house shown in Fig. 10 may be used for hens or for growing chicks. It may be moved from place to place, so that the chickens may have fresh range. This is probably the cheapest type of house for a given floor space, unless it be a house with no side wall at all. The dimensions are 8 ft. by 8 ft. This type of house is often built 10 feet from front to back. The shape of roof is such that it may be moved easily between the rows of trees in an orchard.

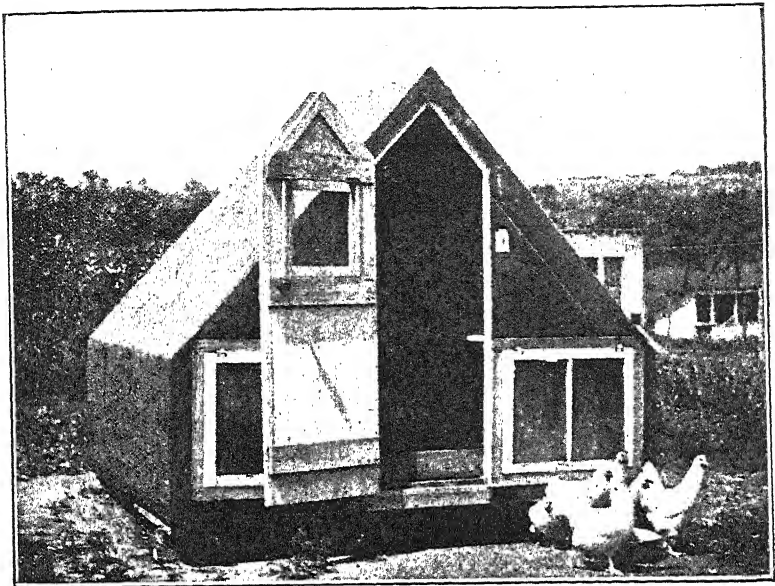


Fig. 10.—An economical house for either hens or growing chicks.

The floor plan of this house is shown in Fig. 11. The dotted lines are the joists for the floor.

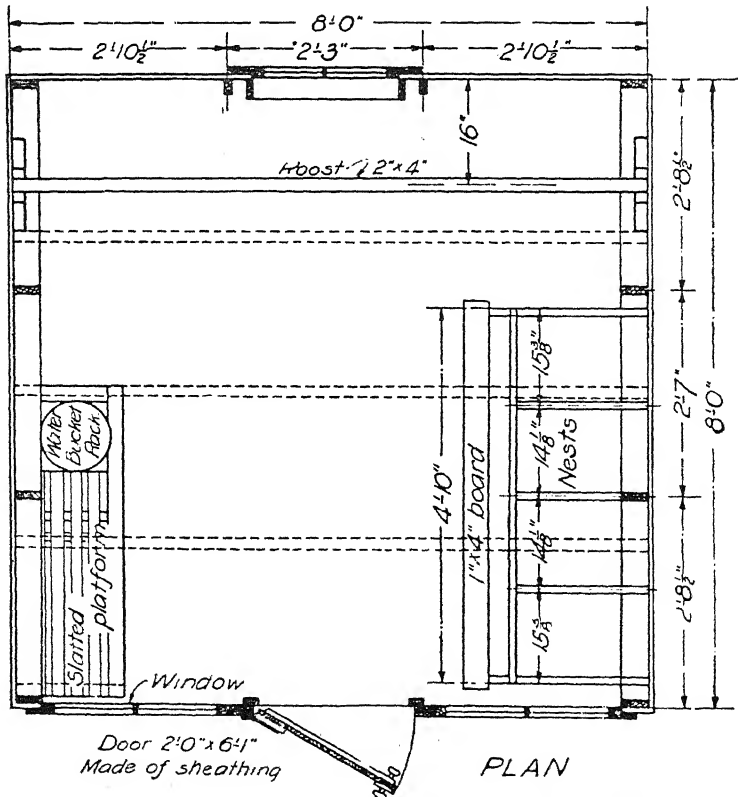


Fig. 11.—Floor plan of house shown in Fig 10 when used for laying hen .

Fig. 12 shows a house made from two piano boxes. There are enough boards in two boxes to make this entire house. The only added expense is the lower framework for the floor, roofing paper, windows, and hardware. This house may be used for growing chicks during the summer and for mature fowls during the rest of the season. It is a very practical type where piano boxes are available at a reasonable cost.

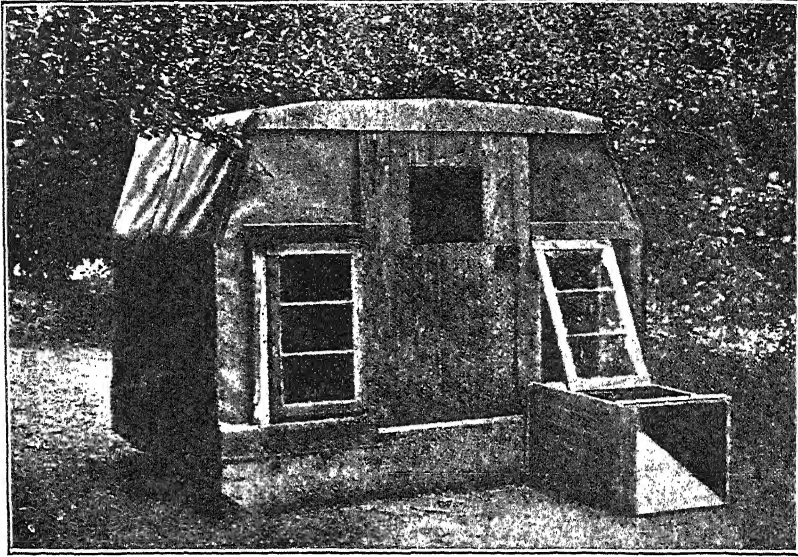


Fig. 12.—House made of two piano boxes covered with roofing paper.

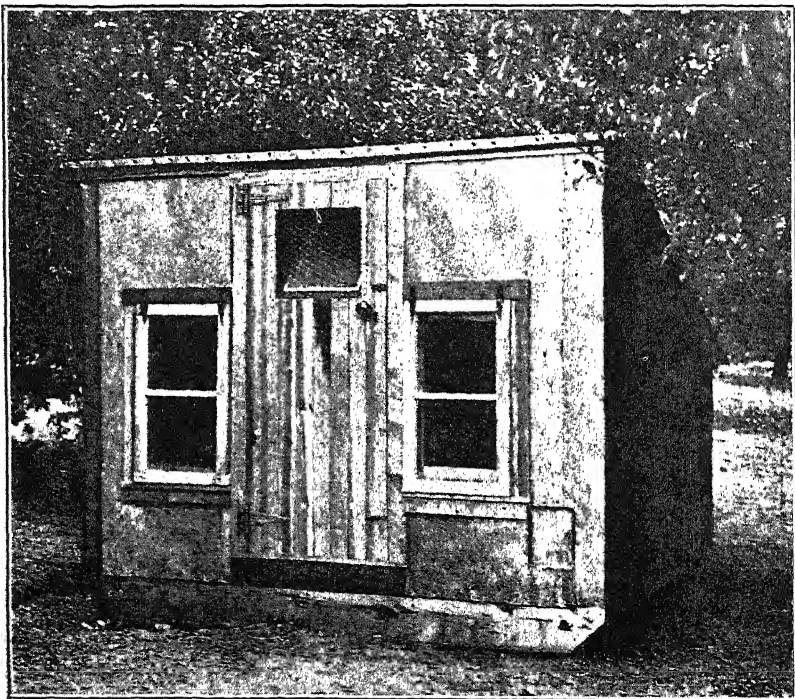


Fig. 13.—Shed-roof colony house for chicks or mature fowls.

For those who wish a shed-roof movable house for hens or growing chicks the house shown in Fig. 13 is suggested. It is necessary to provide more ventilation than is specified if it is used for mature fowls.

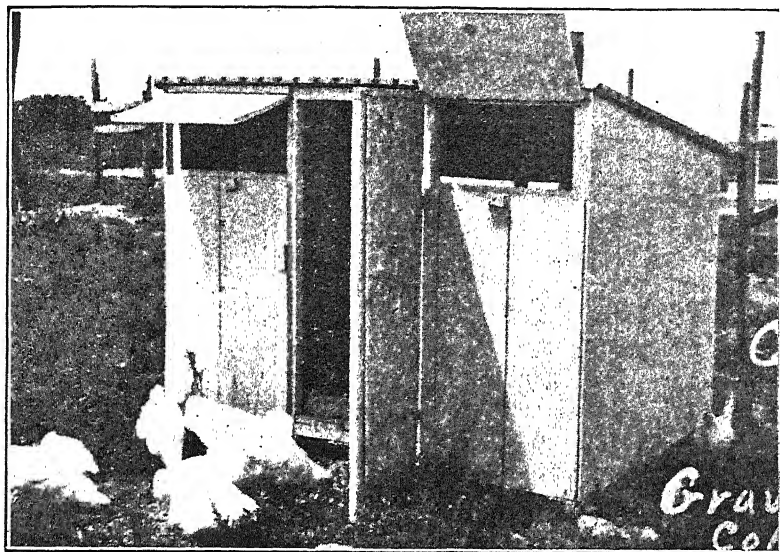


Fig. 14.—Economical coop for growing chicks. It is especially well ventilated.

A farmer in Southern Kansas has solved the problem of housing for a small flock of growing chicks by constructing the small house shown in Fig. 14. The building is sided with ship-lap on a light frame of 2 in. by 2 in. material. It is covered with prepared roofing. Ventilation is well provided for. There is a long, narrow door under the eaves on the back side as well as the two doors on the south side. By properly operating the doors the house may be kept comfortable for the chicks.

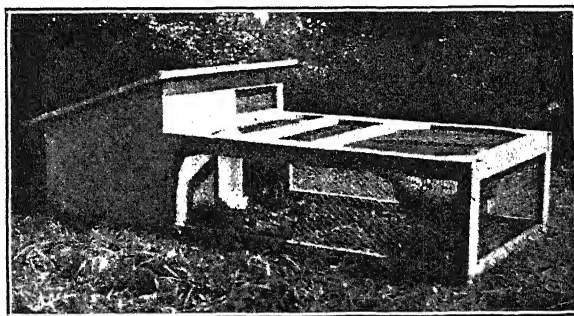


Fig. 15.—Coop and yard for hen and chicks. Chicks are protected from their enemies in such a coop.

The broody coop shown in Fig. 15 is very useful for a hen and chicks, or for a sitting hen. Such a coop should be provided with a tight floor. It will then protect chicks from surface water and rats. The yard makes it possible to confine the chicks while the grass is wet. If hens are confined in such coops until the chicks are several weeks old, the loss of chicks will be much smaller than is often the case.

Fig. 16 shows a very useful and economical broody coop. This is made from a large, tight box with prepared roofing paper fastened over the top for a roof. The door at the front is covered with $\frac{1}{2}$ in. mesh hardware cloth to protect the chicks from enemies without depriving them of proper ventilation. This coop may also be used for sitting hens.

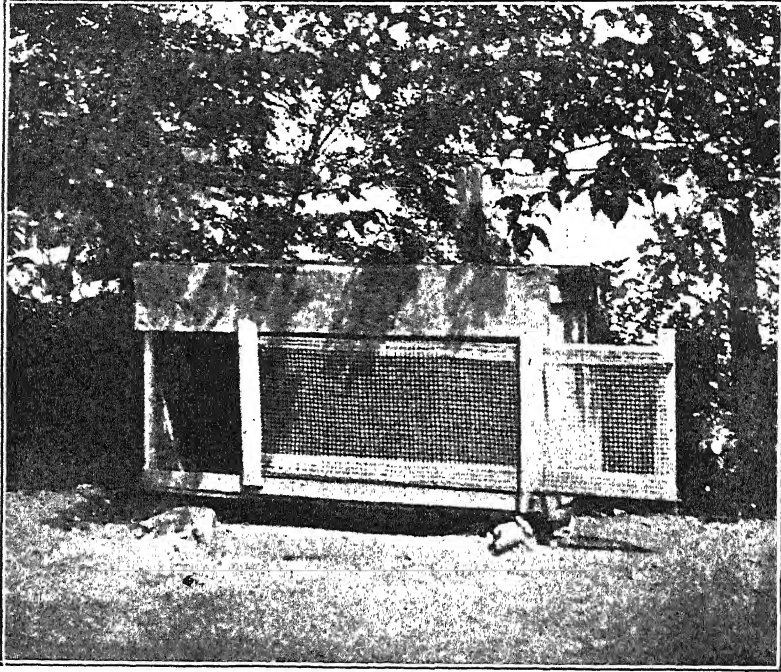


Fig. 16.—Excellent broody coop made from large tight box covered with roofing paper.

SOLAR OVENS.

In view of the scarcity of coal or wood in many subtropical regions, such as Egypt, the Punjab, and the Karoo of South Africa, it is interesting to note the report recently made by Sir F. Nicholson, describing valuable experiments in the employment of solar ovens. These consist of stout teakwood boxes, blackened inside and fitted with a double glass top. They are suitably insulated, and with this simple apparatus a temperature of from 240 degrees to 275 degrees Fahr. is easily obtained during the middle of the day from 11 a.m. to 3 p.m., and 290 degrees with the aid of a single glass mirror. The oven once constructed, the "Journal of the Royal Society of Arts" for 11th May, 1917, points out, costs nothing, and for all mere baking or cooking purposes it is a very efficient and cheap utilisation of sun-heat, suitable for many applications. The disadvantage attached to the process—namely, the hours possible for hot meals being reduced to those in the hottest period of the day—must not be overlooked.—"Agricultural News of Barbados."

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH NOVEMBER TO 26TH DECEMBER, 1917.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%.	Lb.	
Sweet Meadows ...	Jersey ...	8 Aug., 1917	610	6·8	49·23	Slipped calf.
Miss Edition ...	" ...	12 Nov. "	874	4·2	34·14	
Iron Plate ...	" ...	14 Oct. "	850	4·2	41·96	
Hedge's Dutchmaid	Holstein ...	9 Sept. "	817	4·3	41·27	
Auntie's Lass ...	Ayrshire ...	5 July "	898	3·7	38·97	
Violette's Peer's Girl	Jersey ...	26 Oct. "	646	5·0	38·13	
Nina ...	Shorthorn ...	6 Sept. "	835	3·9	38·02	
Thornton Fairetta	Jersey ...	30 June "	476	6·7	37·83	
Miss Bell ...	" ...	27 June "	587	5·4	37·46	
Princess Kate ...	Ayrshire ...	28 June "	603	5·0	35·53	
College Bluebell ...	Jersey ...	28 June "	720	4·2	35·54	
College Damsel ...	Holstein ...	12 July "	817	3·7	35·41	
Netherton Belle ...	Ayrshire ...	17 July "	689	4·3	34·85	
Netherhall Queen	" ...	30 June "	771	3·8	34·34	
Kate						
Lady Annette ...	" ...	19 Oct. "	687	4·2	33·91	
La Hurette Hope	Jersey ...	22 Aug. "	544	5·1	32·76	
Buttercup ..	Shorthorn ...	2 June "	753	3·7	32·64	
Lady Dorset ...	Ayrshire ...	14 Aug. "	721	3·8	32·13	
Lady Melba ...	Holstein ...	12 July "	661	4·1	31·82	
Lady Loch II. ...	Ayrshire ...	3 June "	668	4·0	31·36	
Burlesque ...	Jersey ...	8 Oct. "	483	5·3	31·25	
Glow VI. ...	Guernsey ...	9 Nov. "	714	3·7	30·95	
Skylark ...	Ayrshire ...	24 May "	584	4·3	29·54	
Miss Betty ...	Jersey ...	27 Mar. "	529	4·7	29·31	
College St. Margaret	" ...	9 Nov. "	561	4·4	29·05	
Songstress ...	Ayrshire ...	1 Oct. "	632	3·9	28·92	
Rosine ...	" ...	21 June "	627	3·8	27·93	
College Ma Petite	Jersey ...	10 Nov. "	594	4·0	27·89	
Lilia ...	Ayrshire ...	11 July "	650	3·6	27·41	
Glade ...	Shorthorn ...	29 Mar. "	466	4·8	26·36	
Confidence ...	Ayrshire ...	25 June "	588	3·8	26·19	
Miss Security ...	" ...	27 Mar. "	530	4·2	26·17	
Hedge's Madge ...	Holstein ...	22 Mar. "	491	4·4	25·43	
College Mermaid ...	Jersey ...	21 Aug. "	458	4·7	25·31	
Prim ...	Holstein ...	3 Aug. "	759	2·8	24·67	
Leonie ...	Ayrshire ...	4 Sept. "	587	3·5	24·03	
Windyhill Davidina	" ...	2 July "	496	4·1	23·88	
Lady Mitchell ...	Holstein ...	26 Sept. "	613	3·2	22·88	
Lerida II. ...	Ayrshire ...	2 June "	463	4·2	22·84	

The Orchard.

EXPERIMENTS IN CONNECTION WITH THE DESTRUCTION OF INSECT PESTS OF THE TOMATO.

In May last, the Director of Fruit Culture, Mr. A. H. Benson, with the view of assisting tomato-growers and others to prevent the serious losses of these crops due to the ravages of the tomato moth, by destroying the larvæ, arranged with the Committee of the Wynnum Fruitgrowers' Association to carry out a series of experiments to test the efficacy of certain sprays and various forms of lantern traps. The experiments were carried out on the properties of Mr. Randall, of Wynnum South, and Mr. Hargreaves, Manly, under the direction of Mr. Inspector Leslie. Mr. Randall reported that on the plots sprayed with arsenate of lead the best results were obtained, as the percentage of waste was very light.

Other insecticides were not as efficacious as arsenate of lead. In the control plots the percentage of loss was very much greater both with disease and grubby fruit, and the foliage withered before that of the sections treated.

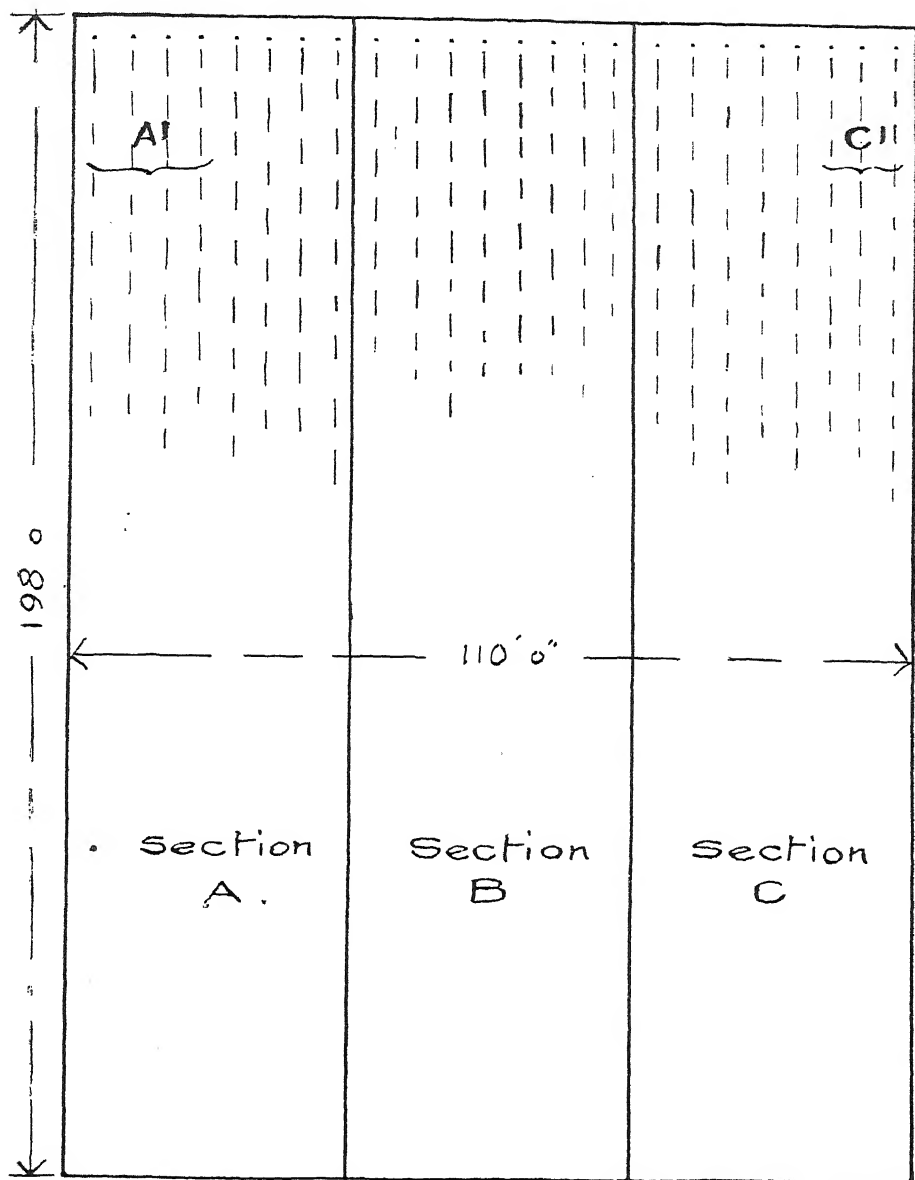
Mr. Hargreaves also states that the general quality of the fruit was superior in the treated sections, and that the spraying had a marked effect in reducing the waste.

Mr. Leslie summarises the result of the experiments as follows:—

1. Arsenate of lead proved the most satisfactory insecticide for the purpose.
2. The ordinary kerosine hurricane lamp, fixed as described and illustrated by him, proved most satisfactory as a trap lantern.
3. That the method of staking adopted was unsatisfactory.

The conditions under which the experiments were undertaken were:—

1. The Director of Fruit Culture undertook to
 - (a) Lay down a plot or series of plots in a certain district.
 - (b) To accept for consideration offers of suitable areas for the purpose.
 - (c) To supply materials, apparatus, and supervision necessary for carrying out of special work or experiments.
2. The grower whose offer was accepted would agree—
 - (a) To carry out the ordinary work of cleaning and cultivation.
 - (b) To reap and market the crop.
 - (c) To keep account of all work done, materials used, the crop, and its value.
 - (d) To allow access to plots and records by the Director and his officers, or anyone genuinely interested.



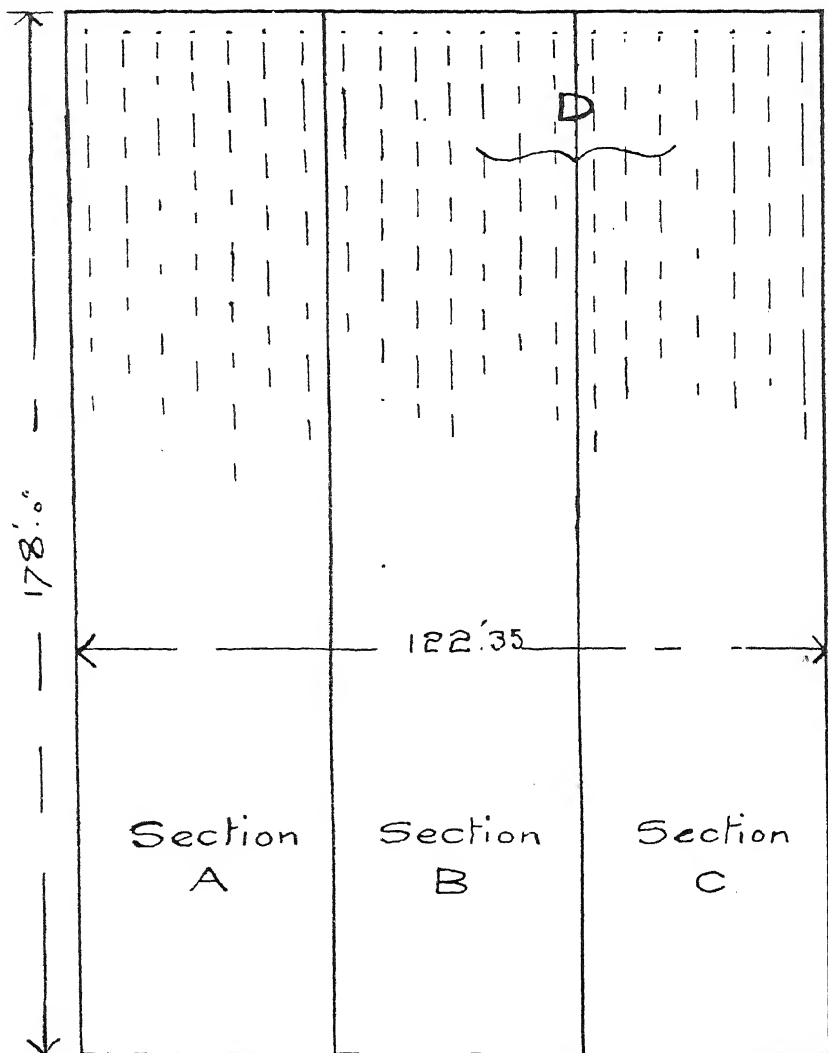
HARGREAVE'S PLOT.

3. It would be understood that the whole proceeds of the crop would belong to the grower.
4. At Wynnum the Director would supply stakes for the tomatoes, insecticides, and materials for trapping moths.

Mr. Inspector Leslie inspected two blocks, and chose those we have mentioned, as one was "new," the other "old" land, and the difference between results on new *versus* old land would thus be ascertainable.

We need not go into the cost of the experiments, which was really trivial, considering the results.

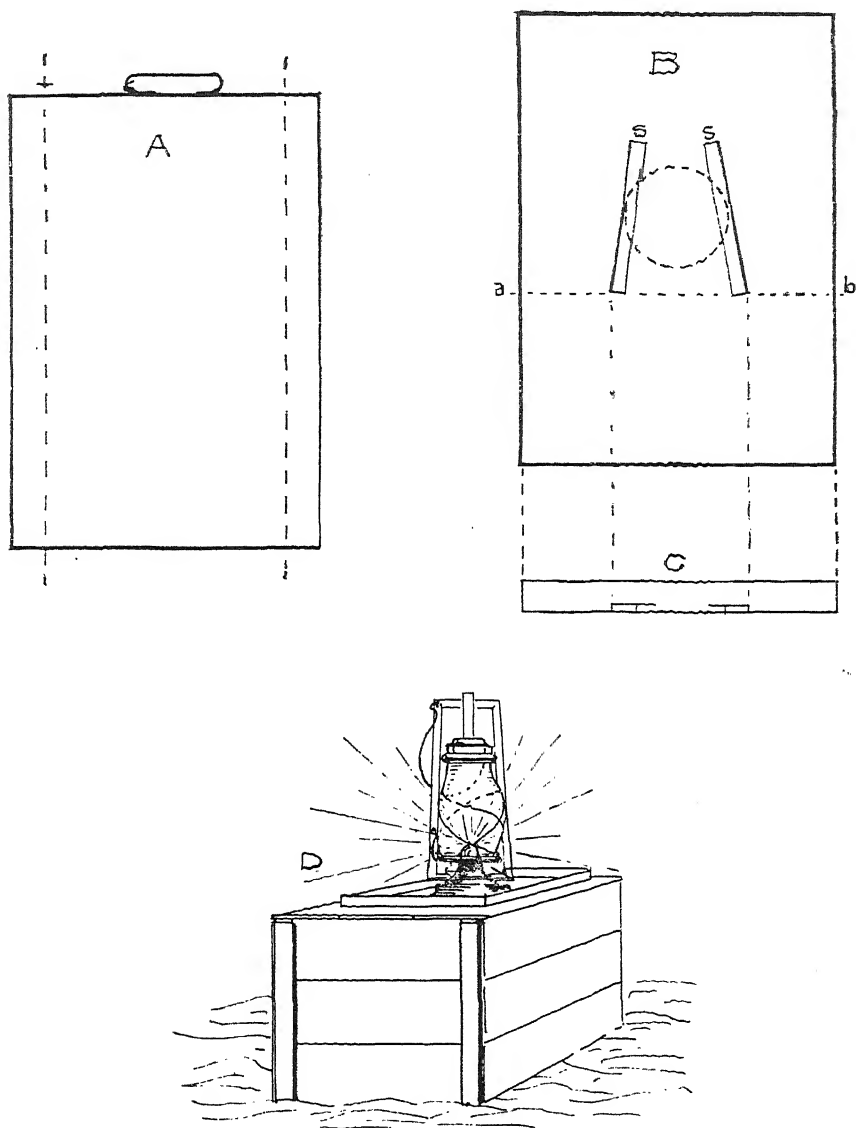
Mr. Leslie's report and diary describing the action of the trap-lamps are very informative, but the exigencies of space preclude our



RANDALL'S PLOT.

including them in these notes; but all information on the work done may be obtained on application to the Director of Fruit Culture.

As already stated, staking the plants proved conclusively that staking and tying were not satisfactory.



REFERENCE TO PHOTOS.

- I. Hargreaves' Plot, 198 ft. by 110 ft., giving 21 rows of tomatoes, 3 sections.
- II. Randall's Plot, 178 ft. by 122.35 ft.
- III. Hurricane Lamp—
 - A.—Showing how to cut the tin, making two trays.
 - B.—Tray-plan, showing position of tin strips (s.s.) soldered to bottom along outside edge only (heavy lines). Dotted circle shows position for base of lamp.
 - C.—Section of tray at *a b*—Elevation.
 - D.—Lamp set in tray on empty fruit-case as used on plantation.

Viticulture.

HINTS TO GRAPEGROWERS.

By C. A. GATTINO.

(Continued from January, 1918.)

WINTER PRUNING.

Having brought the vines to their third year of growth, in accordance with my previous notes, we have to apply a practical method of pruning. The yearly pruning is a difficult subject to describe, and requires, to get the full value, practical lessons on the vines, because each country and district generally adopts a different and special system of pruning.

It is hard to say which of these special methods of pruning is best, as that can only be proved by comparative experiments in the same vineyards.

The climate, the soil, and the method of training the vines, all have great influence on the yearly pruning.

Speaking of vineyard culture, especially in these dry climates, I consider that, for slow growers and very hardy vines planted on rich soil, or strong growers planted on arid soil, the most suitable method would be the "back" or "stool" method. By this system the vine is made to form its head about 1 ft. above the ground. From this head the branches are allowed to start. At the next pruning, keep only the branches destined to be fruit-bearing, and cut them back from two to four eyes according to the vigour of the wood.

The vine will in time appear as a little tree, the fruit-bearing branches of which should be reasonably checked, thus preventing the overstraining of the energy of the vine, which, of course, would reduce the strength of the plant and future returns of fruit.

This method of pruning and training is the best and cheapest for vineyard culture of which I know; it does away with costly supports, trellises, &c., and makes the cultivation of the land, the pruning and spraying of the vines, and the gathering of the grapes easier and cheaper.

The method described is also the best adapted for dry climates, as the sap has not to travel so far or climb so high for the nourishment of the plant, and enables the vine to resist droughts, as the branches and wood are fed with a minimum supply of sap.

Dry pruning may be done at any time in the winter or in the fall, as soon as the leaves have dropped; but where there is danger of frosts, prune only towards the end of winter.

[TO BE CONTINUED.]

Tropical Industries.

INDIA'S SHARE IN THE RICE TRADE OF THE WORLD.

Intending ricegrowers in Queensland would do well to read the following position of the world's rice industry, published in the current number of the "Bulletin of the Imperial Institute," just issued (London: John Murray), which contains an article of seventy pages on the production and uses of rice. Practically all the rice-producing countries of the world are considered separately, in respect both of their rice crops and of their trade in rice, and an attempt is made to arrive at some idea of the world's production of this important foodstuff. It is calculated that the output of cleaned rice in 1916-17, in all countries except China, amounted to about 60,000,000 tons. Of this the British Empire produced about 36,000,000 tons, mostly in India, where the crop (including an allowance of 1,000,000 tons for native States) was no less than 35,000,000 tons. Of the foreign production of 24,000,000 tons, over 20,000,000 tons was grown in five countries—Japan, Netherlands East Indies (chiefly Java), French Indo-China, Siam, and Korea. Estimates of production in China are largely guesswork, but the Imperial Institute, adopting the view that the output in China is not likely to be much inferior to the Indian crop and may exceed it, concludes that 40 per cent., or a little less, would be a fair allowance for India's proportion of the world's annual production of rice.

No less important is the position which India occupies in the world's rice trade as a source of supply for other countries. That is not a necessary consequence of its importance as a rice producer. Some of the countries of largest production—China, Japan, Netherlands East Indies—do not grow enough to supply their own needs, though in the case of Japan the large increase in the rice crops in the last three years has changed a heavy import balance into an export balance, so far as the trade with foreign countries (*i.e.*, excluding Korea and Formosa) is concerned.

The world's export trade in rice is practically under the control of three countries—India, French Indo-China, and Siam. It has been calculated that the quantity of rice which entered into international trade, as shown by the export returns of different countries, amounted in 1913 to about 6,400,000 tons. This includes exports from European countries of rice which has been milled in those countries, which came originally from India, Siam, or Indo-China, and which unduly swells the total by being counted twice over. Even so, the original exports of rice from India amounted to 40 per cent. of the total, while those from Indo-China were 20 per cent., and those from Siam 18 per cent.; in other words, these three countries provided nearly four-fifths of the total.

India's export trade in rice is really dependent on Burma. Not only does Burma provide about three-fourths of the exports of rice from India as a whole (1,835,000 tons out of 2,420,000 tons in 1913-14), but Burma usually sends to other provinces of India more rice than those other provinces export. Without Burma, India would not be self-supporting in rice. As it is, India's exports of rice in the year before the war were equal to the gross requirements of the rest of the Empire, though actually only 42.6 per cent. of the exports went to British countries, and 57.4 per cent. to foreign countries.

The exports direct to the United Kingdom were only between 6 and 7 per cent. of the total. On the other hand, the United Kingdom imported considerable quantities of rice from Holland and Germany which had been first exported from India to those countries, and after being milled and polished there had been re-exported to the United Kingdom.

Ricemilling, at one time a flourishing industry in the United Kingdom, had declined before the war owing to severe competition from the Dutch and German mills, with the result that not only was the British home market partly supplied by foreign-milled rice, but what was at one time the considerable British export trade in fully-milled rice had been reduced in many directions. Since the war both the home and export trade in milled rice have been largely recovered by the British rice-millers, and it is hoped that this industry and trade may be retained after the war. The possibilities of the development of the complete milling of rice in India before export are also a matter for consideration.

The second part of the article deals with the uses of rice both as an article of food and for industrial purposes; the value of rice meal as a feeding stuff for livestock is also discussed. The milling processes are described, and the different grades of rice and the by-products which are obtained are shown in diagrammatic form. Numerous composition tables are given, and comparisons are afforded in this respect between rice and its by-products and other foodstuffs.

In connection with this subject, it may be pointed out that the Indian Committee of the Imperial Institute is now conducting, at the request of the Secretary of State for India, an inquiry into the possibility of increasing the use of Indian raw materials and foodstuffs within the Empire. The inquiry naturally involves an investigation of the extent to which other countries, and especially enemy countries before the war, had secured a predominant share in Indian trade, and the causes which led to this condition.

A Special Committee has investigated the trade in rice, and it is understood has now almost completed its work. The need for such an inquiry is clear from the facts mentioned above regarding the dominant position taken in the rice trade by Germany and Holland, before the war, as compared with the United Kingdom.

Botany.

ALGAROBA, CAROB, OR LOCUST BEANS.

A considerable amount of interest has been aroused recently in regard to the trees which produce these beans. A number of letters from correspondents, and articles appearing in print, show conflicting ideas and a general want of accurate knowledge as to what the trees really are. In order to remove all doubt on the subject, the Director of the Horticulture Division wrote to the Director of Kew Gardens, asking for information. Below is a verbatim copy of the reply:—

“Algaroba,” “Carob,” “Locust,” and “St. John’s Bread” are common names, all of which are applied to *Ceratonia siliqua*, a tree 15 ft. to 20 ft. high; native of Southern Europe and the Mediterranean region. It is wild and cultivated in North Africa; naturalised in certain parts of India; cultivated in the West Indies, &c. The beans are sold in England as “locusts,” and they are an important food for stock.

“Algaroba” is also applied to *Prosopis juliflora* DC., a tree up to 50 ft. in height; native of the West Indies and Central America. It is also known as “honey-locust,” “honey-pod,” “Mesquit bean,” and “cashaw.” The pods are a good food for cattle, horses, and pigs, though death has resulted on occasion after eating damp or undried pods, owing, it has been suggested, to the germination or swelling of the seed in the stomach. They are also an important article of food with the Indians and Mexicans, who grind them into flour for baking purposes.

Parkia biglobosa Benth. and *Parkia filicoides* Benth. are known in West Africa as “locust-bean”; they are both trees, the pods of which are edible.

Gleditschia triacanthos Linn., of the Eastern United States, is known as “honey-locust”; *Robinia pseudacacia* Linn., of the Eastern United States, as “locust-tree”; and *Hymenaea Courbaril* Linn. as “West Indian locust”; but the pods of these trees are not regarded as being edible.

Enterolobium Saman Prain (*Pithecolobium Saman* Benth.), the “guano” or “rain-tree,” a large tree native of tropical America, is grown for the sake of the pods as good fodder for stock in the West Indies, India, &c.—“Journal of Agriculture” of New Zealand.

DESTROYING COCKROACHES.

The West India “Committee Circular” of June, 1917, reproduces useful methods for the destruction of cockroaches recommended by the “Lancet.” For actual, quick destruction, stoving with bromine or sulphur dioxide is apparently best; but for domestic application powdered sodium fluoride, which has the effect of effectually driving away the cockroach, and which at the same time keeps indefinitely, is recommended.

Entomology.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report on Cane Grub Investigation from Dr. J. F. Illingworth and Mr. E. Jarvis, Entomologists to the Bureau:—

The primary emergence of greyback beetles took place earlier than usual this season, about the end of October, and specimens placed in the insectary on 9th November deposited eggs from which grubs hatched out during the first week in December.

Another emergence of this beetle occurred about 3rd December, and, owing to the prolonged showery weather, egg-laden female specimens are still much in evidence (14th December).

Unless we have a considerable emergence later on, this year's flight will be far below the average. Though emergence has been spread over a period longer than usual, comparatively few beetles have been on the trees at any one time.

EMERGENCE OF *LEPIDIOTA FRENCHI* AND *ROTHI*.

In the region immediately around Meringa, both *frenchi* and *rothi* are much more in evidence than the regular cane beetle, *L. albohirta*. These two smaller species began to emerge about the 1st December, and (14th December) they are still abundant on the feeding trees and low shrubs, fences, grass, &c., where they are mating. These beetles emerge earlier in the evening than the greybacks, and they are easier to collect, because they mate on lower objects and can easily be picked off by hand. Often half a dozen pairs are clustered near together, so that they can all be taken in one hand.

Although the usual biennial occurrence of *frenchi* does not take place until next year, small local emergences are generally noticed each season. At present the grubs of *frenchi* are nearly full grown, and doing great damage in places to both ratoon and young plant cane in the region about Gordonvale. This damage results in a peculiar spotted appearance of the field, for here and there, a chain or so in extent, the cane is yellow and often dead, while the surrounding cane is dark-green and thrifty. In one field of plant cane at Meringa, fully one-third of the crop is damaged in this way. The land had not been in cane for some time, and was covered with a heavy growth of burr and grass. The soil was thoroughly worked previous to planting cane; and though many small grubs were noticed, when ploughing, last May, no attention was given to destroying them. These grubs were evidently the younger stages of *frenchi*, which now in their third stage are able to do such serious damage to the roots.

By giving attention to the advice tendered by this office in the monthly report for last May ("Australian Sugar Journal," IX., p. 221), growers will probably be relieved of considerable future damage from these pests.

On 5th November several specimens of *Anomala australasia*, a small dark-green rutellid beetle, were confined in cages at the insectary, and when examined a week later a number of eggs were found that hatched on the 22nd of the same month. We intend working out the life history of this insect, and of other species affecting cane not hitherto recorded.

PARASITISM.

With reference to investigations now in progress regarding certain indigenous parasites of root-eating cane beetles, it may be mentioned that male wasps of *Campsomoris radula* are now emerging from pupæ derived from eggs laid by this species on grubs of *Lepidiota frenchi* at our insectary.

It is interesting to note that the male sex of *C. radula* resembles in general appearance that of the better known digger-wasp, *Dielis formosus*, with which, apparently, it has often been confused by entomologists.

The latter species was described by Tryon in 1902 in an able and instructive treatise entitled "A Parasite of Sugar Cane Beetle Grubs" ("Queensland Agricultural Journal," X., No. 2).

So remarkable, indeed, is the similarity in form and colouration of the adult males of *formosus* and *radula* that specific are confined principally to the presence of a few additional yellow markings on the latter species that are barely visible to the naked eye.

LIGHT TRAPS.

It is our desire in present experiments with light traps, to so simplify them that they may come into common use in canegrowing regions.

A very successful type is simply a large pan, about a yard square, with sides about 4 in. high, the light being furnished by an ordinary acetylene lamp. A sheet of glass, 9 in. by 2 ft., attached to the stem of the lamp with a string, is found to give excellent results in heading off the beetles which circle about the flame, landing them in the tray of kerosene-coated water.

It is found best to have the pan placed on the ground, for if elevated the circling beetles often land beneath it, and in many cases never find their way into the trap.

It is interesting to learn that, though the light appears to have little attraction for the greybacks or the *frenchi* beetles after they have reached their feeding trees, *L. rothi* continues to enter the trap throughout the night. This latter species, though usually rather uncommon, is very abundant this season at Meringa, breeding in an old abandoned field of volunteer cane. These beetles begin dropping from the feeding trees about 9 p.m., and from that time there is a continuous hum as they come to the lamps.

From what is said above, it is evident that the time to catch both the greybacks and *frenchi* in light traps is just at dark in the region of infestation, before the beetles reach the feeding trees. Few results are obtained by exposing the lights for more than an hour. The value of this treatment is, however, in that the female beetles are destroyed before they can lay their eggs.

WHEN THE CLOCK STOPS.

Referring to a suggestion published in the issue of this journal for August, 1917, as to what to do when a clock persists in stopping, Mr. R. B. Stephens, Mellum Mountain, Landsborough, has kindly sent us the following method of proceeding when no professional horologist is available. Many of our country readers will doubtless be glad of the information:—

I notice in the August number of your valuable journal a paragraph on "When the Clock Stops." Knowing how inconvenient it is in the bush to have one's clock troubled with the stops, I would like to give my way of keeping them going. First of all, procure a bottle of 3 in 1 oil, a piece of thin wire (the same that is used for wiring down beer-bottle corks), a pair of pliers, a small screwdriver, and an egg-cup. These constitute all the necessary tools that are required to make a first-class bush clock cleaner.

Now take hold of your clock, examine it carefully for ten minutes, and you should then see how the works are kept in position. If your clock is of the usual twenty-four-hour American, round type, the works will either be held in by the legs upon which it stands, or by several small screws. Remove these, and you can then draw out the whole of the internal works.

If your clock is of the pendulum type, remove the pendulum, and also carefully remove the face and hands, being careful to notice how and in what position the hands are placed so as to replace them in exactly the same way. Now take out the screws that hold the works to the case, and lift them out. Turn your egg-cup upside down; pour on to it a few drops of the oil, and with a piece of the wire, about 4 in. long, lift a small bead or drop of oil on the end of the wire by lifting the wire from the oil in a horizontal position. Then, having taken the works in the hand, deposit a bead of oil on every place where the spindle ends go through, or into the brass frame; also touch lightly with oil the escapement (the part that causes the tick). Now replace everything as you first found them, after first winding the clock, and in ninety-nine cases out of a hundred your clock will cause you no further trouble for quite a long time. When it does then repeat the dose. With a pendulum clock, after it has been returned to its shelf, listen if it ticks regularly. If not, lift first one side or the other till this is accomplished, and pack it up to that with strips of cardboard or a book, and your clock should then go for years. But be sure that it ticks regularly. One of my clocks, which cost, new, 15s., has been going for twenty-six years under the above treatment, and will probably be going long after I have stopped. There is a book under one side of it about $\frac{3}{4}$ in. thick, and it keeps going year in and year out. The above will be found to give entire satisfaction if carefully done, and I am sure will be almost as easy as the kerosene method.

General Notes.

AGRICULTURAL, HORTICULTURAL, AND PASTORAL SOCIETIES IN QUEENSLAND.

SHOW DATES FOR 1918.

Allora.—Central Downs Agricultural and Horticultural Association. Show dates: 20th and 21st February, 1918. J. C. Marshall, secretary.

Atherton.—Atherton Agricultural, Pastoral, and Industrial Society. W. C. Abbott, secretary.

Beaudesert.—Logan and Albert Agricultural and Pastoral Society. A. Winship, secretary.

Beenleigh.—Agricultural and Pastoral Society of South Queensland. Show dates: 19th and 20th September, 1918. R. Newburn, secretary.

Biggenden.—Biggenden Agricultural and Pastoral Society. Show dates: 27th and 28th June, 1918. C. J. Stephensen, secretary.

Boonah.—Fassifern Agricultural and Pastoral Association. Show dates: 15th and 16th May, 1918. G. E. Bell, secretary.

Belmont.—Belmont Agricultural, Horticultural, and Industrial Society. Show date: 24th August, 1918. J. A. Walker, secretary.

Brisbane.—National Agricultural and Industrial Association. Show dates: 12th to 17th August, 1918. J. Bain, secretary.

Bundaberg.—Bundaberg Agricultural, Pastoral, and Industrial Society. Show dates: 29th to 31st May, 1918. Redmond Bros., secretaries.

Caboolture.—Caboolture Pastoral, Agricultural, and Industrial Society. A. Toms, secretary.

Cairns.—Cairns Agricultural, Pastoral, and Mining Association. Nevitt and Boden, secretaries.

Caves, *via* Rockhampton.—Central Barmoyea Farmers' Progress Association. B. P. F. Smith, secretary.

Charleville.—Central Warrego Pastoral and Agricultural Association. A. Cahill, secretary.

Childers.—Childers Pastoral, Agricultural, and Industrial Society. W. J. Thompson, secretary.

Chinchilla.—Chinchilla Agricultural and Pastoral Association. Show dates: 9th and 10th April, 1918. W. L. Archer, secretary.

Clifton.—Darling Downs Pastoral, Agricultural, and Industrial Association. Show dates: 20th and 21st March, 1918. P. G. A. Murphy, secretary.

Crow's Nest.—Crow's Nest Agricultural, Horticultural, and Industrial Society. Show dates: 2nd and 3rd April, 1918. W. B. Carlile, secretary.

Emerald.—Emerald Pastoral and Agricultural Society. Show dates: 30th and 31st May, 1918. J. Esmond, secretary.

Esk.—Toogoolawah Pastoral, Agricultural, and Industrial Association. Show dates: 1st and 2nd May, 1918, at Toogoolawah. T. C. Pryde, secretary.

Gin Gin.—Gin Gin Agricultural, Pastoral, and Industrial Society. Show dates: 5th and 6th June, 1918. C. M. Morris, secretary.

Gladstone.—Port Curtis Agricultural, Pastoral, and Mining Association. Show dates: 4th to 6th June, 1918. J. T. W. Brown, secretary.

Goombungee.—Goombungee Agricultural, Horticultural, and Pastoral Society. Show date: 27th March, 1918. E. J. Moore, secretary.

Goondiwindi.—Macintyre Pastoral and Agricultural Society. Show dates: 23rd and 24th April, 1918. J. A. Hall, secretary.

Gympie.—Gympie Agricultural, Mining, and Pastoral Society. Show dates: 28th and 29th August, 1918. F. W. Shepherd, secretary.

Ipswich.—The Queensland Pastoral and Agricultural Society. Show dates: 22nd and 23rd May, 1918. G. W. Allen, secretary.

Kilcoy.—Kilcoy Pastoral, Agricultural, and Industrial Society. Show dates: 4th and 5th July, 1918. A. R. Hooper, secretary.

Kilkivan.—Kilkivan Pastoral, Agricultural, and Industrial Association. Show dates: 29th and 30th May, 1918. M. O. Aronsten, secretary.

Killarney.—Killarney Agricultural Society. Show dates: 27th and 28th February, 1918. W. D. McGilvray, secretary.

Kingaroy.—Agricultural, Pastoral, and Industrial Society. Show dates: 24th and 25th April, 1918. R. A. Pearse, secretary.

Lockyer.—Lockyer Agricultural and Industrial Society. R. Thomas, secretary.

Longreach.—Longreach Pastoral and Agricultural Society. J. Forrest, secretary.

Lowood.—Lowood and Tarampa Pastoral and Agricultural Association. Show dates: 7th and 8th May, 1918. W. E. Michel, secretary.

Marburg.—Marburg and District Agricultural and Industrial Association. Show dates: 1st and 3rd June, 1918. F. H. Bielefeld, secretary.

Maryborough.—Wide Bay and Burnett Pastoral and Agricultural Society. Show dates: 11th to 13th June, 1918. H. A. Jones, secretary.

Nambour.—Maroochy Pastoral, Agricultural, Horticultural, and Industrial Society. Show dates: 24th and 25th July, 1918. J. J. Wilkinson, secretary.

Nanango.—Nanango Agricultural, Pastoral, and Mining Society. Show dates: 6th and 7th March, 1918. S. Cavaye, secretary.

North Pine.—The Pine Rivers Agricultural, Horticultural, and Industrial Association. Show dates: 21st and 22nd June, 1918. G. Armstrong, secretary.

Pittsworth.—Pittsworth Pastoral, Agricultural, and Horticultural Association. Show date: 23rd January, 1918. L. G. Sims, secretary.

Pomona.—Noosa Agricultural, Horticultural, and Industrial Society. Show dates: 15th and 16th May, 1918. H. Robinson, secretary.

Rockhampton.—Rockhampton Agricultural Society. Show dates: 20th to 22nd June, 1918. H. Hill, secretary.

Roma.—Western Pastoral and Agricultural Association of Queensland. F. W. Mills, secretary.

Rosewood.—Rosewood Agricultural and Horticultural Association. Show dates: 24th and 25th July, 1918. A. J. Loveday, secretary.

Southport Agricultural, Horticultural, and Industrial Society. S. H. Earle, secretary.

Stanthorpe.—Stanthorpe Agricultural Society. Show dates: 7th and 8th February, 1918. A. E. Bateman, secretary.

Toowoomba.—Royal Agricultural Society of Queensland. Show dates: 16th to 18th April, 1918. G. Noble, secretary.

Toombul Agricultural, Horticultural, and Industrial Association. F. Shaw, secretary.

Warwick.—Eastern Downs Horticultural and Agricultural Association. Show dates: 12th to 14th February, 1918. H. Sterne, secretary.

Wondai.—Wondai Agricultural, Pastoral, and Industrial Society. Show dates: 22nd and 23rd May, 1918. H. J. Compagnoni, secretary.

Woodford.—Woodford Agricultural, Pastoral, and Industrial Society. Show dates: 18th and 19th July, 1918. G. H. Osmond, secretary.

Zillmere.—Zillmere Agricultural, Horticultural, and Industrial Society. Show date: 21st September, 1918. A. B. Marquis, secretary.

TO CLEAN RUSTED HORSE-SHOE NAILS.

During the rainy season in the tropics, horse-shoe nails, even though covered, frequently get so rusty as to be quite unusable. Mr. J. F. Keane, Mareeba, says:—"To clean them, take a few (twenty-four is a convenient number) and pack them heads to point in equal numbers on a strip of canvas or sacking long enough to wrap about three times round them. Roll them up tightly, and tie two strings, also tightly,

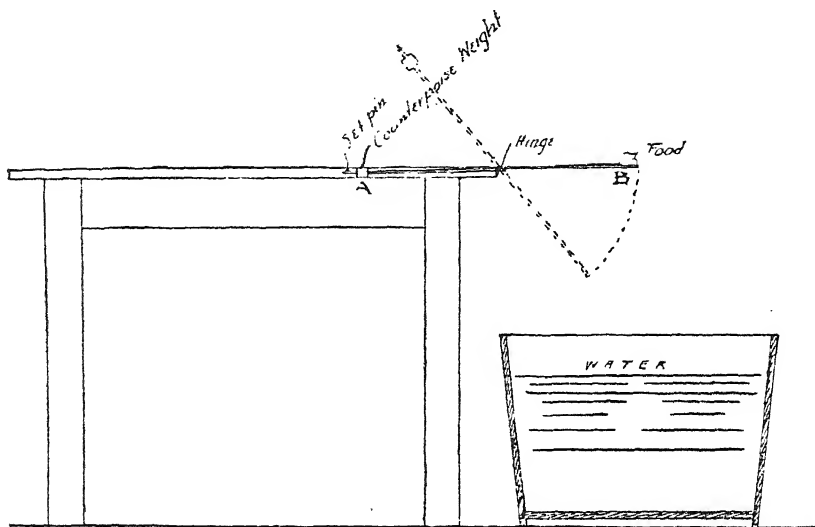


round the parcel, close to the heads of the nails, as shown in the illustration, which is half natural size. Roll the parcel backwards and forwards between the palms for three or four minutes. Then cut the string, blow the rust or dust off the nails, and they will be found as bright as new pins, ready for use.

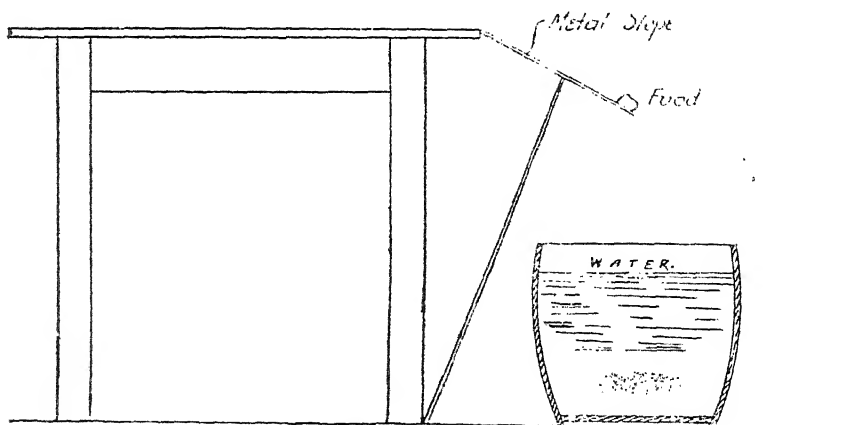
"Rusty needles may also be burnished in this way, if there are enough to make a roller, using a piece of strong, light rag."

NOTES ON SIMPLE RAT TRAPS.

The "Journal of the Board of Trade," England, devotes several pages to a description of various devices for entrapping the wary rat, two of which we select as likely to be of use to readers who are troubled with rats in the house. No. 1 is the Table or Shelf Trap, No. 2 the Table Slope Trap, here illustrated.



No. 1.—The Table or Shelf Trap.



No. 2.—The Table Slope Trap.

Answers to Correspondents.

THE BRITISH ARMY.

IGNORAMUS—

There are many who put to us the questions as to the constitution of the British Army. This information can be obtained correctly by an application to headquarters. So far, however, as we can help you to an idea of the numbers constituting regiments, battalions, brigades, army corps, divisions, &c., take the following:—

“The unit of cavalry is a regiment, and of infantry a battalion. Each British cavalry regiment in war consists of about 553 officers and men, each regiment containing three squadrons of 164 men (besides the machine-gun section, ambulance, &c.). Three cavalry regiments make a cavalry brigade (about 1,700 officers and men), and four cavalry brigades make a cavalry division, which, including four batteries of horse artillery (24 guns) and other troops attached to it, numbers about 10,000 officers and men. An infantry battalion numbers about 1,020 all told. Four battalions go to an infantry brigade (about 4,150). A division (of infantry) consists of three infantry brigades (about 12,400), with 70 guns, engineers, ambulances—in all, amounting to just under 20,000 men. Two divisions make an army corps (40,000). Any number of army corps—but usually from two to five or six—may be clubbed together as an army. An army corps (which was a unit invented by Napoleon) is in most countries increased from 40,000 to nearer 50,000 when all the reserves have had time to join.”

COTTON BONUS.

COTTON-GROWER—

No. The Commonwealth bonus of 10 per cent. on cotton produced in Queensland was only in force from 1st July, 1907, to 13th June, 1916, when it lapsed. It affected the grower in that the purchaser of the seed cotton, who ginned it, by obtaining the bonus, was enabled to give the grower a higher price for his product delivered at the ginnery. The Department of Agriculture and Stock for the coming season and two subsequent seasons will make an advance to cotton-growers of 2d. per lb. on all good, clean cotton delivered at the Department's ginnery, William street. Any profit accruing after the cotton has been ginned and sold will be divided amongst suppliers according to the quantity sent in to be dealt with.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JANUARY, 1918.

Article.							JANUARY.	
							Prices.	
Bacon	...	...	...	...	...	lb.	9½d. to 10d.	
Barley	...	...	...	...	...	bush.	2s. 6d. to 3s.	
Bran	...	...	...	...	...	ton	£5 15s.	
Broom Millet	...	...	...	...	...	"	£30 to £50	
Butter	...	...	...	...	...	cwt.	149s. 4d.	
Chaff, Mixed	...	...	...	...	...	ton	£3 10s. to £4	
Chaff, Oaten	...	...	...	...	...	"	£6 10s.	
Chaff, Lucerne	...	...	...	...	...	"	£3 to £5	
Chaff, Wheaten	...	...	...	...	...	"	£4 5s. to £4 15s.	
Cheese	...	...	...	...	...	lb.	9½d. to 10d.	
Flour	...	...	...	...	...	ton	£12	
Hams	...	...	...	...	...	lb.	1s. 3d. to 1s. 10d.	
Hay, Oaten	...	...	...	...	...	ton	£7 10s.	
Hay, Lucerne	...	...	...	...	...	"	£2 5s. to £2 15s.	
Hay, Wheaten	...	...	...	...	...	"	£4 5s.	
Honey	...	...	...	...	...	lb.	2½d. to 3d.	
Maize	...	...	...	...	...	bush.	4s. 6d. to 5s.	
Oats	...	...	...	...	...	"	1s. 6d. to 2s. 6d.	
Onions	...	...	...	...	...	ton	£8 to £10	
Peanuts	...	...	...	...	...	lb.	4d. to 6d.	
Pollard	...	...	...	...	...	ton	£6 12s. 6d. to £7	
Potatoes	...	...	...	...	...	"	£2 10s. to £7 5s.	
Potatoes (Sweet)	...	...	...	...	...	sug. bag	1s. 9d. to 2s.	
Pumpkins (Cattle)	...	...	...	...	...	ton	£2 10s. to £6	
Eggs	...	...	...	...	...	doz.	9d. to 1s. 2d.	
Fowls	...	...	...	...	...	per pair	4s. to 5s.	
Ducks, English	...	...	...	...	...	"	4s. 6d. to 5s.	
Ducks, Muscovy	...	...	...	...	...	"	7s. to 8s. 6d.	
Geese	...	...	...	...	...	"	10s. to 11s.	
Turkeys (Hens)	...	...	...	...	...	"	12s. to 14s.	
Turkeys (Gobblers)	...	...	...	...	...	"	18s. to 26s.	
Wheat	...	...	...	...	...	bush.	4s. 2d. to 4s. 3d.	

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen bundles	...	...	...	...	...	6s. to 12s.
Cabbages, per sack	...	...	...	...	...	2s. 6d. to 6s.
Cauliflowers, per dozen	...	...	...	...	...	...
Chocos, per dozen	...	...	...	...	...	1s. 6d. to 2s.
Beans, per sugar bag	...	...	...	...	...	3s. 6d. to 6s.
Peas, per sugar bag	...	...	...	...	...	4s. to 7s.
Carrots, per dozen bunches	...	...	...	...	...	4d. to 1s.
Beetroot, per dozen bunches	...	...	...	...	...	6d. to 9d.
Lettuce, per dozen	...	...	...	...	...	1s. to 1s. 6d.
Parsnips, per dozen bundles	...	...	...	...	...	6d. to 1s.
Sweet Potatoes, per sugar bag	...	...	...	...	...	1s. 6d. to 2s.
Table Pumpkins, per dozen	...	...	...	...	...	1s. to 2s. 6d.
Marrows, per dozen	...	...	...	...	...	6d. to 1s. 6d.
Tomatoes, per case	...	...	...	...	...	2s. 6d. to 4s.
Cucumbers, per dozen	...	...	...	...	...	1s. to 1s. 6d.

SOUTHERN FRUIT MARKETS.

Article.	JANUARY.	
	Prices.	
Bananas (Queensland), per crate	9s. to 12s.	
Bananas (Tweed River), per crate	4s. to 6s.	
Bananas (Fiji), per bunch... ..	5s. to 6s. 6d.	
Bananas (G.M.), per crate	18s. to 21s.	
Mangoes, per case	4s. to 5s.	
Oranges (Navel), per case	10s. to 14s.	
Oranges (Seville), per bushel case ... ..	...
Oranges (other), per case	7s. to 10s.	
Papaw Apples, per half-bushel case	6s. to 7s.	
Passion Fruit, per half case	4s. to 7s.	
Pineapples (Queens), per double case	10s. to 14s.	
Pineapples (Ripleys), per double case	7s. to 9s.	
Pineapples (Common), per double case	7s. to 9s.	
Tomatoes (Queensland), per half-bushel case	1s. 6d. to 3s.	
Cucumbers, per bushel case	6s. to 8s.	
Strawberries, per lb. ... ..	...

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	JANUARY.	
	Prices.	
Apples, Eating, per bushel case	15s. to 22s.	
Apples, Cooking, per bushel case	3s. to 5s. 6d.	
Apricots, per case	4s. to 6s.	
Bananas (Cavendish), per dozen	1½d. to 4½d.	
Bananas (Sugar), per dozen	4d. to 4½d.	
Cape Gooseberries, per quart	9d.	
Cherries, per box	7s. to 11s.	
Citrons, per hundredweight	10s.	
Cocoanuts, per sack	12s. to 15s.	
Cumquats, per quarter-case ... ..	...
Grapes, per lb.	1½d. to 4d.	
Lemons (Lisbon), per case	6s. to 8s.	
Mandarins, per case	10s. to 15s.	
Mangoes, per case	3s. to 6s.	
Oranges (Navel), per case	17s. 6d.	
Oranges (Seville), per hundredweight	3s. 6d. to 10s.	
Oranges (other), per case	6s. to 12s.	
Papaw Apples, per quarter-case	1s. to 1s. 6d.	
Passion Fruit, per quarter-case	2s. to 3s.	
Peaches, per quarter-case	3s. to 6s. 6d.	
Pears, per quarter-case	12s. 6d. to 18s. 6d.	
Peanuts, per lb.	4d. to 6d.	
Pineapples (Ripleys), per dozen	6s. 6d. to 7s. 6d.	
Pineapples (Rough), per dozen	2s. to 5s.	
Pineapples (Smooth), per dozen	3s. to 5s.	
Plums, per half-bushel case	4s. to 5s. 6d.	
Plums, per quarter case	2s. to 3s.	
Rockmelons, per dozen	1s. to 2s.	
Strawberries, per dozen boxes	2s. to 3s. 6d.	
Tomatoes, per case	3s. to 5s. 6d.	
Watermelons, per dozen	2s. to 7s.	

TOP PRICES, ENOGGERA YARDS, DECEMBER, 1917.

Animal.	DECEMBER.	
	Prices.	
Bullocks	£24 5s. to £28 2s. 6d.	
Cows	£16 12s. 6d. to £20 2s. 6d.	
Cows (Single) ... ..	...
Merino Wethers	46s. 6d.	
Crossbred Wethers	50s.	
Merino Ewes	30s.	
Crossbred Ewes	44s. 9d.	
Lambs	37s. 3d.	
Pigs (Backfatters)	£5	
Pigs (Baconers)	69s.	
Pigs (Porkers)	58s.	
Pigs (Slips)	13s. 6d.	

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF DECEMBER 1917, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING DECEMBER, 1917 AND 1916, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Dec.	No. of Years' Records.	Dec., 1917.	Dec., 1916.		Dec.	No. of Years' Records.	Dec., 1917.	Dec., 1916.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
Atherton	In.		In.	In.	Nambour	In.		In.	In.
Cairns	7.10	15	9.81	17.74	Nanango	6.03	20	7.74	13.80
Cairns	8.99	34	13.14	25.14	Rockhampton	3.64	24	4.54	3.39
Cairdwell	8.14	44	12.27	24.15	Woodford	4.33	29	3.09	9.44
Cooktown	6.67	40	21.68	16.03		5.25	29	5.56	11.02
Herberton	5.35	29	7.39	13.81	<i>Darling Downs.</i>				
Ingham	6.28	24	18.26	24.98	Dalby	3.14	46	4.07	1.64
Innisfail	11.91	35	25.33	29.99	Emu Vale	3.49	20	5.05	2.51
Mossman	16.20	5	15.37	26.43	Jimbour	3.22	28	3.26	1.04
Townsville	5.44	45	11.03	17.99	Miles	2.57	31	1.96	2.07
<i>Central Coast.</i>					Stanthorpe	3.45	43	5.99	2.59
Ayr	3.56	29	8.22	8.31	Toowoomba	4.19	44	6.10	3.72
Bowen	4.13	45	16.05	11.04	Warwick	3.46	29	4.95	2.26
Charters Towers	3.50	34	3.09	10.69	<i>Maranoa.</i>				
Mackay	6.76	45	13.19	17.56	Roma	2.32	42	2.34	3.38
Proserpina	7.79	13	19.30	24.54	<i>State Farms, &c.</i>				
St. Lawrence	4.28	45	8.32	8.45	Bungewongorai	2.33	5	3.10	5.69
<i>South Coast.</i>					Gatton College	3.32	17	7.14	2.63
Biggenden	4.74	17	3.28	2.66	Gindie	2.58	17	2.23	9.82
Bundaberg	4.45	33	3.02	6.63	Hermitage	2.64	10	4.38	2.82
Brisbane	5.02	66	5.19	5.10	Kairi	9.79	5	10.55	18.89
Childers	5.23	21	2.64	6.29	Kamerunga	6.30	26	13.91	23.58
Crohamhurst	6.37	23	7.38	12.33	Sugar Experiment Station, Mackay	7.99	...	13.04	24.44
Esk	4.35	29	6.17	2.93	Warren	4.34	5	3.28	7.93
Gayndah	3.86	45	2.91	3.38					
Gympie	5.89	46	6.91	5.31					
Glasshouse M'tains	6.64	8	...	14.24					
Kilkivan	4.28	37	4.39	3.98					
Maryborough	4.49	45	5.21	5.59					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for December, 1917, and for the same period of 1916, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

Farm and Garden Notes for March.

FIELD.—Take every opportunity of turning up the ground in readiness for sowing and planting winter crops. The main crop of potatoes should at once be planted. As the growth of weeds will now be slackening off, lucerne may be sown on deeply cultivated soil. The latter should be rich and friable, with a porous subsoil. The land should be thoroughly pulverised. Do not waste time and money in trying to grow lucerne on land with a stiff clay subsoil. Prepare the land a couple of months before sowing, care being taken to cross plough and harrow before the weeds have gone to seed. This ensures a clean field. Sow either broadcast or in drills. In the former case, 20 lb. of seed will be required; in the latter, 10 lb. A good stand of lucerne has been obtained with less quantities. Should weeds make their appearance before the plants have sent down their tap roots, mow the field. Before they can again make headway enough to do any damage, the lucerne will be strong enough to hold its own against them. Harrow and roll the land after mowing. Gather all ripe corn. It is now too late to sow maize, even 90-Day, with any certainty of harvesting a crop of grain. Rye grass, prairie grass, oats, barley (in some districts, wheat), sorghum, vetches, carrots, mangolds, and Swede turnips may be sown. In Northern Queensland, sow tobacco seed, cowpea, carob beans, sweet potatoes, opium poppy, &c. Sow anatto, jack fruit, and plant kola-nut cuttings. Some temperate-zone vegetables may be planted, such as egg plant, potatoes, &c. Coffee-planting may be continued. Harvest kafir corn and paddy. Cotton picking will now be in full swing. Pick cleanly, and expose to the sun for a few hours before storing or baling. Pick none but fully ripe bolls.

FLOWER GARDEN.—Now is the time to plant out bulbs. A complete garden could be furnished with these charming plants, which are to be had in every colour and variety. Amongst the many are—*Amaryllis*, *anemone*, *arum*, *babiana*, *crinum*, *crocus*, *freesia*, *ranunculus*, *jonquils*, *iris*, *ixias*, *gladiolus*, *narcissus*, *Jacobean*, *lilies*, *tigridia*, *tritonias*.

All bulbs like well-drained, somewhat sandy soil, with a plentiful admixture of leaf mould. Herbaceous plants and annuals which it is intended to raise from seed should be sown this month. Such are *antirrhinums* (snapdragon), *asters*, *corafflowers*, *dianthus*, *larkspurs*, *daisies*, *cosmea*, *candytuft*, *lupins*, *gaillardias*, *godetia*, *mignonette*, *poppies*, *pansies*, *phlox*, *sweet peas*. Cannas now planted will require plenty of food in the shape of liquid manure. Put in cuttings of carnations. *Chrysanthemums* require attention in the way of disbudding, staking, watering with liquid manure, &c. Growers for exhibition will thin out to a few buds and protect the flowers from rain and sun. Dahlias should be looking well. To secure fine blooms, disbudding should be done.

Now, as to climbers which may now be planted. These are—*Allamanda Schottii* (beautiful yellow), *Antigonon leptopus*, a charming cerise-coloured climber; *Aristolochia elegans*, handsome as an orchid, and easily grown; *Aristolochia ornithocephala* (Dutchman's Pipe), very curious, large, always attracts attention; *Asparagus plumosa* grows in any shady place; *Beaumontia grandiflora*, splendid white flower, grand for a fence, will grow 50 ft. high; *Bignonia*s of several kinds; *Bougainvilleas*, with their splendid leafy pink and purple flowers, rapidly clothe a fence or unsightly shed with a blaze of blossom; *Quisqualis indica*, a fine creeper, flowers pink, changing to white; *Wistaria*, purple and white. Most beautiful is the *Bauhinia scandens*, rarely seen about Brisbane. We grew a plant of this climber at Nundah, and it soon closed in the front of the veranda for a distance of over 80 ft. The leaves are very small, and in the flowering season it presents almost a solid mass of beautiful round bunches of blossoms, something like the hawthorn bloom—pink and white. It seeds freely, but the seeds are difficult to germinate, and when they have produced a plant it is still more difficult to rear it. A rooted sucker from the main stem will in all probability grow.

KITCHEN GARDEN.—During this month a very large variety of vegetable seeds may be sown in readiness for planting out where necessary in the autumn, which begins on the 20th of March. All unoccupied land should be roughly dug, and, where required, add well-decomposed manure. Transplant cabbage, cauliflower, celery, &c. Sow French and Broad beans, beet, carrot, turnips, radish, cabbage, cauliflower, cress, peas, onions, mustard, &c. Former sowings should be thinned out and kept clear of weeds. Mulch round melon and cucumber beds with a good dressing of long stable manure, as it assists in keeping the fruit clean and free from damp. Cucumbers, melons, French beans, and tomatoes should be looked for every day and gathered, whether required or not, for, if left on the vines to perfect their seeds, the plants will soon cease to be productive, or will form inferior, ill-shaped, and hence unsaleable fruit.

Orchard Notes for March.

THE SOUTHERN COAST DISTRICTS.

The marketing of the main crop of pineapples will continue to occupy the attention of growers; and as it is probable that the plantations have been allowed to get somewhat dirty during the previous month, they should be cleaned up as soon as ever the crop has been got off. The fruit of the new crop of citrus fruit will be showing signs of ripening towards the end of the month; and, as the fruit during this period of its growth is very liable to the attack of insect pests of various kinds, it is important that steps should be taken to prevent loss arising from this cause as far as possible.

Large sucking moths of several kinds attack the fruit as soon as it shows signs of ripening; and, as they always select the first fruit that shows signs of colouring, it is a good plan to gather a few forward fruit and to ripen them up quickly by placing them on a barn floor, and covering them up with bags or straw. They will turn colour in a few days, and develop the characteristic scent of the ripening fruit. The fruit so treated should be hung up in conspicuous places in the orchard as trap-fruit, as not only will it attract the moths, but also the fruit-flies. The moths will be found clustered round the trap-fruits in large numbers, and can then be easily caught and destroyed. Fruit-fly will also puncture such fruit; and if the fruit is destroyed before the larvæ reach maturity, a later crop of these insects is prevented from hatching out. Fruit-flies may also be caught in large numbers by means of such artificially ripened fruits. The fruits are smeared with tanglefoot, and hung about the orchard. The fly, attracted by the colour, settles on the fruit, and is caught in a similar manner to house-flies on specially prepared sticky paper. These simple remedies, if carefully carried out, will result in the destruction of large numbers of sucking moths and fruit-flies.

The yellow peach-moth that does such damage to peaches in spring, and that attacks corn, sorghum, cotton bolls, custard apples, and many other plants and fruits, often does a lot of damage to citrus fruits. It acts in a very similar manner to the second and later generations of the codling moth of pomaceous fruits, in that it lays its eggs where two fruits touch, under the shelter of a leaf on the fruit, at the stem end of the fruit, and, in the case of navel oranges, in the navel itself; in fact, anywhere that there is a likelihood of the egg not being disturbed. The egg hatches out into a small spotted caterpillar, which eats its way into the fruit, causing it to ripen prematurely, and fall off. Where two fruits touch, it often eats into and destroys both, and it frequently leaves one fruit to go and destroy a second. It is a very difficult insect to deal with, owing to the number of fruits and plants on which it lives; but, as far as citrus fruits are concerned, the best remedy is undoubtedly to spray the fruit with a remedy that will destroy the young insect when it starts to eat the skin of the fruit. Bordeaux mixture has been found efficacious, but I am of opinion that spraying with Paris green and lime, Kedzie's mixture, or arsenite of lead will also have good results. The latter poison is, in my opinion, well worth giving a thorough test, as it sticks to the fruit and leaves for a long time. Bordeaux mixture, either alone or in conjunction with Paris green or Kedzie's mixture, is, however, a good remedy, as not only will it destroy the larvæ or prevent the moth from attacking the tree, but it is also the best remedy for black brand or melanose, as well as tending to keep all other fungus pests in check. Fight fruit-fly systematically—both by means of the sticky fruit already recommended and by gathering all fly-infested fruit, such as guavas, late mangoes, kumquats, &c., as well as any oranges or mandarins that may have been infested, as if kept in check now there will be little loss throughout the season. A little fruit will be marketed towards the end of the month. See that it is gathered and sweated for seven days before marketing, and don't gather it too immature. Beauty of Glen Retreat mandarins are often gathered and marketed as soon as they show signs of colouring. They are then as sour as a lemon, and anyone who is unlucky enough to buy them will steer off mandarins for some time to come. This variety should not be gathered till thoroughly ripe, as when marketed in an immature state it spoils the market, as it puts people off eating citrus fruit.

Clean up the orchard after the summer rains, and have everything ready for the marketing of the crop. See that there is a good supply of clean, dry case timber on hand, as one of the greatest sources of loss in shipment is packing fruit in green cases.

Strawberry planting can be done throughout the month. Plant such berries as Federation on the lowest ground, and Aurie, Anetta, Trollop's Victoria, and Glenfield Beauty on warm, well-drained soils. Prepare the land thoroughly, so that it is in perfect tilth, and in a fit state to retain moisture well; as on this, as much as anything, the success of the crop depends. Where new orchards are to be planted, get the land ready—not the clearing, which should have been done months ago, but the working of the land, as it is advisable to get it thoroughly sweetened before putting the trees in.

THE TROPICAL COAST DISTRICTS.

The Notes for February apply equally to March. See that bananas are netted—keep down weed growth, and market any sound citrus fruits. Clean up the orchards as well as possible, and keep pines clean. Get land ready where new orchards are to be set out, as tree-planting can be done during April and May. Pines and bananas can still be planted, as they will become well established before winter.

THE SOUTHERN AND CENTRAL TABLELANDS.

Finish the gathering of the later varieties of deciduous fruits, as well as grapes. Clean up the orchard, and get ready for winter. Get new land ready for planting; and where there are old, dead, or useless trees to be removed, dig them out and leave the ground to sweeten, so that when a new tree is planted to replace them the ground will be in good order.

In the drier parts, where citrus trees are grown, keep the land well worked, and water where necessary.

GUNFIRE AND RAINFALL.

There used to exist, and it exists even to the present day, a popular belief that the explosion of guns induces rainfall, and special guns were constructed with the object of bringing down falls of rain during dry seasons. Several experiments to test this theory were made some years ago in Queensland by means of kites and guns, but all resulted in failure.

In an article in the London "Times" of 21st December, 1914, we find the following notes on the subject:—

"An impression has arisen in some quarters that the heavy and persistent rains recently experienced in this country (Great Britain) are attributable to abnormal atmospheric disturbances produced by heavy gun-firing at the seat of war. The idea is by no means novel, and, like other meteorological myths (such, for instance, as the belief in thunderbolts and the supposed influence of the moon upon our weather), it seems to possess a bullet-proof hide and takes any amount of killing. About four years ago the First Lord of the Admiralty was asked in the House of Commons whether he would instruct the Fleet to carry out their heavy gun practice at some period of the year other than in the middle of harvest time, 'when the resultant heavy rain may cause serious loss to the farming community.' A similar suggestion was made at the instance of a member of the Highland and Agricultural Society of Scotland who, at a meeting of that body, moved that 'the Admiralty be petitioned to discontinue heavy gun-fire round the coasts in August and September, when clouds were about' (*sic*), the speaker adding that 'firing was apt to bring down rain, and at that time of the year fine weather was desirable.' It may be said at once that the idea is absolutely without foundation. Experiments made some years ago in America and on the Continent showed that in droughty weather no amount of concussion in the air artificially produced had the slightest effect in the production of rain.

"At the present time there is one fact which should (one scarcely likes to believe that it will) at once dispose of the cherished theory. In spite of occasional displays of unwonted activity, there are no reasons for thinking that gun-firing at the front is more violent than it was in the earlier stages of the war. The spell of unsettled weather should, therefore, have commenced shortly after the outbreak of hostilities. As a matter of fact, nothing of the kind took place. In August and September the rainfall in the south-east of England was, on the contrary, much below the average, and in October there was again a considerable though less marked deficiency.

"As an instance of the unreliability of the notion respecting the effect of detonation upon rainfall, a correspondent of 'Symons's Meteorological Magazine' drew attention some little time ago to the fact that at Shoeburyness, where at certain seasons of the year big guns are being fired almost daily, the average annual rainfall is smaller than in any other part of the United Kingdom."

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		PHASES OF THE MOON.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	4:57	6:46	5:21	6:41	5:41	6:19	5:58	5:46	The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.
2	4:58	6:46	5:22	6:41	5:41	6:18	5:59	5:45	
3	4:59	6:46	5:23	6:40	5:42	6:17	5:59	5:44	H. M.
4	4:59	6:46	5:24	6:40	5:43	6:16	6:0	5:43	
5	5:0	6:46	5:25	6:39	5:44	6:15	6:0	5:42	5 Jan. ☾ Last Quarter 9 49 p.m.
6	5:1	6:47	5:25	6:39	5:45	6:14	6:1	5:41	13 " ● New Moon 8 36 a.m.
7	5:2	6:47	5:26	6:38	5:45	6:13	6:1	5:39	20 " ☾ First Quarter 12 38 "
8	5:3	6:47	5:27	6:37	5:46	6:12	6:2	5:38	27 " ○ Full Moon 1 14 p.m.
9	5:3	6:47	5:28	6:36	5:46	6:11	6:2	5:37	The Moon will be at Perigee on 15th, Apogee on 3rd and 31st.
10	5:4	6:48	5:29	6:35	5:47	6:10	6:3	5:36	
11	5:5	6:48	5:29	6:35	5:47	6:9	6:3	5:35	4 Feb. ☾ Last Quarter 5 52 p.m.
12	5:6	6:47	5:30	6:34	5:48	6:8	6:4	5:34	11 " ● New Moon 8 5 "
13	5:6	6:47	5:31	6:33	5:48	6:7	6:4	5:33	18 " ☾ First Quarter 10 57 a.m.
14	5:7	6:47	5:32	6:32	5:49	6:6	6:5	5:32	26 " ○ Full Moon 7 35 p.m.
15	5:8	6:47	5:32	6:32	5:49	6:5	6:5	5:31	The Moon will be at Perigee on 12th, Apogee on 28th.
16	5:9	6:47	5:33	6:31	5:50	6:3	6:6	5:30	
17	5:9	6:47	5:34	6:30	5:50	6:2	6:6	5:29	6 Mar. ☾ Last Quarter 10 44 a.m.
18	5:10	6:47	5:35	6:29	5:51	6:1	6:7	5:28	
19	5:11	6:47	5:35	6:28	5:51	6:0	6:7	5:27	13 " ● New Moon 5 52 p.m.
20	5:12	6:46	5:36	6:28	5:52	5:59	6:8	5:26	19 " ☾ First Quarter 11 30 "
21	5:13	6:46	5:37	6:27	5:52	5:58	6:8	5:25	28 " ○ Full Moon 1 33 "
22	5:13	6:46	5:37	6:26	5:53	5:57	6:8	5:24	The Moon will be at Perigee on 13th, Apogee on 27th.
23	5:14	6:45	5:38	6:25	5:53	5:56	6:9	5:23	
24	5:15	6:45	5:38	6:24	5:54	5:55	6:9	5:23	4 April ☾ Last Quarter 11 33 p.m.
25	5:16	6:45	5:39	6:23	5:54	5:54	6:10	5:22	
26	5:16	6:44	5:39	6:22	5:55	5:52	6:10	5:21	11 " ● New Moon 2 34 "
27	5:17	6:44	5:40	6:21	5:55	5:51	6:11	5:20	18 " ☾ First Quarter 2 8 "
28	5:18	6:43	5:40	6:20	5:56	5:50	6:11	5:19	26 " ○ Full Moon 6 5 "
29	5:19	6:43	...	...	5:57	5:49	6:12	5:18	The Moon will be at Perigee on 10th, Apogee on 23rd.
30	5:19	6:42	...	...	5:57	5:48	6:12	5:18	
31	5:20	6:42	...	...	5:58	5:47	...	...

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset may be roughly arrived at by adding 17 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

For the sunrise and sunset at Rockhampton, Townsville, Cairns, and other places in Queensland, readers may be referred to the "Queenslander" to which newspaper monthly astronomical notes will be supplied.—D.E.

QUEENSLAND AGRICULTURAL JOURNAL

VOL IX.

MARCH, 1918.

PART 3.

Agriculture.

CULTIVATION OF THE POTATO.

(Continued from February, 1918.)

By THE EDITOR.

CROSS FERTILISATION.

Mr. Findlay, the celebrated raiser of so many new varieties of potatoes, in the course of a lecture before the Glasgow and West of Scotland Agricultural Discussion Society, spoke as follows on cross-fertilising and raising new varieties from seed:—

In the first place, I am distinctly of opinion that natural cross-fertilisation never took place in any part of the world at any period of the world's history. The blossom of the potato has a faintly sweet smell, yet it secretes no honey or nectar, and the pollen seems to be a bit too sharp and tasty to suit the palate of even the most voracious insect. In fact, it is highly poisonous, and I daresay that is where their objection comes in. I have seen now and again a bumble bee, no doubt attracted by the sweet smell of the blossom, alight on the edge of the petal, but never saw one explore the bloom, as is their habit where they expect to find either nectar or pollen. As the most casual observer will have noticed, the potato is an early closer, shutting up its blossoms between 2 and 3 o'clock in the afternoon, and, by reason of a certain twisting process, puts it out of the power of any nocturnal moth or other insect to gain access to either nectar or pollen, even though they both were there. In the second place, I hold it is utterly impossible for the pollen of one blossom to be wide-borne, and so fertilise another, even on the same plant, one reason being that it is too heavy, and another, and more important one, being that it is a bi-sexual plant. Both the sexual organs are in the same bloom, the anthers or pollen cases being the male parts, and the pistil representing the female. And it further appears to me that, for some reason which I have not been able to discover, the potato plant is by nature opposed to cross-fertilisation, for, immediately the pollen in the anthers is matured, the bloom twists itself up harder than ever round the pistil, and no longer opens out to greet the sun. The bloom then no longer stands erect on its stem, but begins to hang down, swaying in the breeze. The pollen falls down into the narrow space formed by the twisting of the petals, all around the bulbous point of the pistil. The bloom thus remains for the matter of two days, and then falls off. Strange to say, the pistil only absorbs a very limited portion of the pollen. Yet what is left, so far as I have been able to discover, is perfectly inert. The potato, as I have already said, is, in my opinion, opposed to cross-fertilisation.

HOW HE RAISES FROM THE SEED.

Continuing, Mr. Findlay said, dealing with his method of working:—First I get a shallow seed pan, such as gardeners use, attend to the drainage, fill it up, or nearly, with well-decomposed leaf mould, to which has been added a little fine sand. I take a flat piece of wood, and beat it down fairly firm and level, and sow the seeds thinly and evenly over the flat and firm surface. That done, I take and sift, after adding more sand, some more of this leaf mould. The sifting will remove all grit and stones. Now sprinkle a small portion over the seeds, but see that you do it evenly and not over-thick—as near to an eighth of an inch as you can; give also a slight beat down. If the mould is fairly moist, you need not give any water for at least two days. Set your tray, to be out of the way of mishap, into the sunny corner of a cold frame. Put a piece of old newspaper or other paper over the tray, covering up with a piece of glass. Your great care now is to see that you do not allow the earth or mould to get dry; at the same time you must guard against making it too wet. In a week or ten days your seed should begin to braid. You must then give them more light and air. With average care, in a very short time you will have nice plants. When about an inch high, put them out in small pots singly. In another three weeks or so, if the weather is suitable, and the season far enough advanced, plant them out in the open where you mean them to be permanently. After this, your work is all in the ordinary course; only, remember this, you must take care when you harvest them to keep the produce of every plant by itself—I mean those you intend to grow again. Fifty per cent. or more will be of no use to go further with; and this 50 per cent. left year by year, you, if wise, will further reduce, until at the end of four years you have only one or two left as the sole representatives of your labour and care.

I am not aware that any attempts have been made by Queensland potato-growers to raise new varieties from seed. The potato plant flowers freely in this State, although the flowers usually drop off before the fruit or "apple" is formed. Where, however, the "fruit" as distinct from the "tuber" comes to maturity, there is no other reason why Australian growers should not evolve a prolific disease-resisting potato equal to some of those lately raised from seed in England and sold at such enormous prices. A correspondent of the "Agricultural Gazette," London, has, through the inquiry column of that journal, elicited the following instructions for raising new varieties from seed:—

Those who desire to produce new varieties of potatoes must first practise the art of cross-fertilisation, and must possess abundant patience. Like many other species which are not habitually multiplied by seed, the potato has a remarkable tendency to revert to the wild form. It may be necessary to cultivate 100 or even 1,000 seedlings, before finding one which is really worthy of a place among the better varieties already existing. M. Vilmorin says that in France the raising of seed potatoes has been proceeded with in a somewhat haphazard manner; whereas in England, on the other hand, a more systematic method has been followed, richness in starch, excellence of flavour, power of resisting disease, with little tendency to develop haulm, being the characters we on this side of the channel generally seek. With regard to cross-fertilisation, it is rather a delicate operation, and needs time and attention to details. Directly the flower begins to open, the anthers must be removed carefully with a pair of fine-pointed scissors. This is necessary to prevent its own pollen from falling on the stigma and self-fertilising the ovary. It is well also to tie a piece of soft muslin round the emasculated flower. You have now to examine the flowers of the other variety which is to act as the male or husband. You may have to examine dozens of flowers before you will find one with its anthers bearing the precious pollen in a powdery form, as some varieties are exceedingly shy pollen-bearers, owing to the energies of the plant being occupied in producing tubers at the expense of full development of its masculine attributes. When you find the pollen dust, collect it carefully on the point of a clean, dry camel-hair brush, and gently brush it on the point of the stigma or female organ that you had previously protected by means of muslin. You must, however, not do this prematurely, but wait till you observe the point of the stigma covered with a viscous-looking fluid. Then, and then only, the stigma is ready for the nuptial rites to be performed. Do not remove the muslin; this will serve to prevent the berry when ripe from falling and scattering its precious seeds. It will easily be ascertained when the berry is ripe, and then the latter should be gathered, placed in a box in a room to become thoroughly dry, after which remove the seeds, place them in a packet, and store them away safely till spring. But, when the seed has been saved after much pains and trouble, it will require some humouring when it is time to sow. Then the seeds should be sown in pans or shallow boxes 3 in. deep, containing an inch of drainage, then a layer of moss, and sufficient compost, equal parts of light loam and leaf-mould, to fill the box or pan to the top. Press the compost down firmly with a piece of board, and sprinkle some fine sand over it. Sow the seeds thinly, and then cover with an inch of finely sifted mould.

The soil must not be too moist or too dry, as the seeds may die in one case or rot in the other. The seedlings should appear in about ten days, and they must have abundance of fresh air. Some writers suggest that the soil should be baked before sowing it over the seeds, as the damping-off fungus is rather to be dreaded.

JUDGING POTATOES AT SHOWS.

Because a potato has a high-sounding name, and because it is a new variety, judges are satisfied to examine the interior and exterior of the raw potato and award it a prize or disqualify it according as its symmetry and healthy appearance appeal to their judgment. But does this examination satisfy the public? What the farmer wants to know is, its cropping power and its powers of resisting disease, and its early or late appearance on the market. What the housewife wants to know is, what are its cooking properties. It is of little importance that a certain potato exhibit has obtained first prize, for a crop must be a very poor one if, out of 5, 10, or 20 acres a bag or two of tubers cannot be obtained which will satisfy a judge in all that concerns the eye. But there are splendid-looking potatoes which will not stand the cooking test. Some, when cooked, smell of the earth; others show none of that beautiful, mealy appearance which is the characteristic of a good cooking potato. One that bursts its jacket when properly cooked, and shows a beautiful dry mealy exudation is surely preferable to one that is soupy or waxy. The market price of potatoes depends largely on the quality of the cooked tuber. At some shows the judges are supplied with a plate of hot cooked potatoes of each variety exhibited, and thus are able to determine what, after all, is the only true test of the value of a potato—its cooking qualities. Size is certainly not everything. It would be a move in the right direction if all potato exhibits at shows were accompanied on judging day by a dish of each variety cooked by an artist—for to cook a potato properly is a work of the culinary art not understood by all cooks.

QUANTITY OF SEED POTATOES REQUIRED TO PLANT AN ACRE OF LAND.

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to understand where the germs that first infest a crop come from, and with the well-known necessary conditions of moisture and warmth, an epidemic breaks out at once. If the necessary conditions are wanting, however, the fungus, although present, cannot attack the potato leaves; but the absence of disease does not necessarily prove the absence of the fungus, but only the absence of the conditions necessary to enable the fungus to attack its host. In all probability, the fungus is always present in land where potatoes are grown at short intervals, as in this State.

It is just as important to collect the old "sets," or the whole crop of diseased potatoes, as it is to gather the sound ones. "But," says the farmer, "such work would never pay." It might not appear so, but eventually it would more than pay.

A second very fertile source of disease is due to planting infected potatoes. Perhaps no farmer would plant obviously diseased potatoes, but the danger arises when the potatoes exhibit none of the external signs of the disease, but, when cut, just show indications of the discoloured patches characteristic of the fungus. The obvious check to this source of danger is to cut all potatoes used for planting, refusing those suspected of being diseased.

POTATO SCAB.

This disease, characterised by the presence of scurvy or scab-like patches on the skin of the potato, is very prevalent during certain seasons; and, although the edible portion of the potato is not injured, the market value is much depreciated. There is also another form of scab superficially resembling the one described, caused by an organism called *Oospora scabies*. The disease is prevented in both cases by steeping seed potatoes for two hours in half a pint of formalin mixed with 15 gallons of water.

Another remedy is said to be efficacious, and that is, to dissolve 2 oz. of corrosive sublimate in 16 gallons of water; when fully dissolved, put the seed potatoes in a bag and immerse them in the mixture, not leaving them to soak, but only long enough to ensure that all the seed is thoroughly wetted. Corrosive sublimate is highly poisonous, and must be handled carefully, a wooden vessel being used to dissolve it in. A potato affection was, in 1899, brought under the notice of the Queensland Department of Agriculture as occurring in the Gramzow and Alberton districts of Beenleigh, and it was found to be identical with the new disease of the potato plant whose nature and cause were first made known in 1894 by Mr. Henry Tryon, Government Entomologist. The disease was probably brought into the Beenleigh district many years since in seed potatoes.

The symptoms of the disease are as follows:—

When the potato plant is in process of vigorous growth, and exhibits every evidence of health, it suddenly commences to droop as if lacking moisture; after a few hours it generally becomes flaccid, its branches bend downwards, and its leaves have their edges turned inwards so as to expose their under surface. These events happen in a few hours, and the plant thus smitten never revives, but gradually succumbs. On examination, the roots and tubers will be found, to all appearances, perfectly sound. But careful examination reveals a faint, ring-shaped line, which is seen on the section of a healthy tuber at a short distance within and parallel to the surface. This ring of the healthy tuber is more evident than usual from having become darkened in colour. Later on, an opaque, thick, white, tenacious fluid exudes in minute quantity from the eyes of the tuber; and it is this which causes the earth to strongly adhere to these points when the tuber is taken from the ground and permitted to dry. If kept perfectly dry, the tuber usually undergoes no destructive changes; but if left in the soil, or placed in a damp atmosphere, destructive changes occur and eventually the whole potato becomes a mere mass of corruption. Mr. Tryon has described minutely the whole course of the disease in the issue of this Journal for July, 1899, to which I refer my readers.

TREATMENT.

As soon as the disease is recognised, every part of the affected plants should be removed, leaving not a particle behind. Then the ground should be opened up and lime applied to kill the plant-microbe. Once the disease has shown itself, potatoes should not be again planted for the succeeding crop on the same land, but two or more crops of, say, maize or brown millet, should be taken off. It should be noted that no plants of the same order should be planted on the infected ground, especially not tomatoes.

THE IMPORTANCE OF SPRAYING POTATOES.

A few experiments conducted by the University College of North Wales in spraying potatoes clearly emphasise the importance of conforming to this modern innovation in farm practice. These trials were carried out on different farms in the counties of Anglesey, Carnarvon, Denbigh, and Flint. In every single instance

spraying gave good results, in some cases markedly so. In the matter of marketable potatoes the average in the unsprayed crops was 7 tons 19 cwt. 96 lb. per acre. When sprayed once there was an increase of 1 ton 8 cwt. 91 lb.; sprayed twice, 2 tons 1 cwt. 26 lb.; but the late spraying did not effect such a large increase. There were fewer small potatoes by the use of the sprayer, and less than half the diseased tubers when twice sprayed. The following directions have been issued by Professor Winter, indicating how the operations may be carried out:—

Directions for Spraying Potatoes.

The following dressing is sufficient for 1 acre:—24 lb. sulphate of copper (98 per cent. pure), 30 lb. pure washing soda, 120 gallons of water. Washing soda is recommended in preference to lime. As in practice it will usually be difficult to dissolve the above quantity at one operation, we would suggest that the mixture should be prepared in a wooden vessel which will hold 25 gallons of water. First wash out this vessel thoroughly, and pour into it 15 gallons of clean water; then take 4 lb. sulphate of copper broken to a fine powder; place it in a canvas bag and stir it about in the water until the sulphate of copper is all dissolved. Next dissolve 5 lb. of washing soda in 5 gallons of water in a separate tub; then pour the washing soda solution into the sulphate of copper solution, and stir well. The mixture should then be tested with blue litmus paper; if the litmus is turned red more washing soda should be dissolved, and steadily added until fresh litmus paper put into the solution remains blue. The quantity of material thus prepared is sufficient for one-sixth of an acre. As the nozzles of spraying machines are easily choked, the mixture should be poured into the machine through a canvas cloth. Spraying should be done twice, three weeks apart.

PREPARATION OF THE SOIL.

In regard to ordinary tillage cultivation, it is indisputable that land intended to bear a good yield can scarcely be brought to too fine a tilth. The rootlets will spread with greater rapidity, and be enabled to take up their nutriment better, if the soil is well pulverised.

If forest land is to be operated on, the first work necessary is, of course, stumping and clearing off the growing timber at least two months before the land is to be broken up. If the soil is black and heavy, as it is in many parts of the State, notably in the Lockyer district and on the Darling Downs, it should be broken up in the autumn, and allowed to lie fallow until the end of June, when it should be harrowed down as fine as possible, and then well rolled. Then the land should be ploughed a second time, crossways, to a depth of 8 in. or more. By so doing the sour soil is turned to the top, and the soil which has been mellowed by sun and rain will be laid under.

Now let the land lie till the end of July. At that time, scarify it with a cultivator, and then give it a final ploughing and harrowing, when it will be in fit condition to be planted in September.

If new scrub land has to be dealt with, when the scrub has been felled and burnt off, the stumps will remain in the ground for some three years, when most of them will have rotted out or can more easily be removed than when they were green. But although the whole of the land is permeated with a network of roots, potatoes may be planted by breaking it up in rows 2 ft. wide with a strong hoe, which easily cuts through the soft roots of the scrub trees. There is no danger in this case of stagnant water collecting in the rows, as the porous scrub soil will drain off the superfluous moisture; hence potatoes can endure far more rain in such soil than if planted on forest land or on black-soil plains.

The season for planting having arrived, the next thing to consider is whether whole potatoes or cut sets should be planted. This will all depend upon the season, whether the autumn or the spring sowing. For the winter crop whole seed is preferable, whilst cut sets are usually planted for the summer crop. I have already given the quantity of seed potatoes required per acre as varying from 8 to 12 cwt., according to circumstances, distance between rows and plants, and the use of whole or cut potatoes being the chief factors determining the quantity needed. When the seed is cut, it is well to sprinkle the sets with dry ashes, which will have the effect of hardening the cut surfaces and preventing the possibility of rotting should the seed lie over long in the ground before coming up. If, however, the seed has been properly sprouted before planting, there is little danger to be apprehended. The seed should be carted to the field in bags and placed at convenient distances along the rows, which are now being drawn to a depth of about 5 to 6 in., at a distance of 2 ft. 6 in. apart. The sets are laid in the furrow at from 12 to 14 in. apart, cut side down. The planted rows may be covered with the harrow.

GROWING POTATOES ON THE SURFACE.

Very good crops of potatoes have been produced without putting the set underground. The tuber itself is not the root of the plant, but merely an excrescence which contains plant food. The roots themselves, which are fibrous and branched, are produced below the tubers; and, provided they have a suitable soil to enter, the plant will flourish, and tubers will be produced, if certain conditions are observed. The method is as follows:—Break up the soil, and work it down fine, manuring it with stable manure or chemical fertilisers. Plant the sets on the surface, and press them into the soil until half buried, or just cover them with a little light soil; then cover the plot with straw, grass, or similar material to a depth of from 2 to 3 ft., and keep it moist. The potato stems will grow up through the straw, and produce tubers in the lower layers. The straw must be just kept nicely moist. An old method of producing a constant supply of tubers is described as follows:—Place the sets about 6 in. apart each way; build round the plot a pen with rails several inches apart, cover with straw to a depth of 3 ft. or more, and throw over it a few buckets of water occasionally. The tubers produced can be removed as far as the arm will reach through the crevices, from time to time, without seriously disturbing the plants. A large quantity of smooth, clean potatoes of good quality can be raised on a comparatively small area by this means.

GROWING BY IRRIGATION.

Where irrigation is adopted it is possible to ruin a whole crop by unscientific watering. The potato certainly delights in a cool moist soil; but it is one thing to apply the right amount of moisture and another to saturate the soil. As a general rule, the haulms should be allowed to attain a good degree of growth and be well in blossom before water is applied.

Some varieties require more water than others, and, some soils being porous and others retentive, varying quantities of water will be needed. Water applied too soon will often turn the vines yellow, and permanently check their growth. On the other hand, if the ground is very dry at the period when the potatoes are setting, as we term the formation of the young tubers, it often happens that no after application of the water will remedy the matter, and a short crop is the result. When the ground gets very hot and dry, and the vines turn dark-coloured and cease to grow, water becomes necessary at no matter what season, unless the crop has already matured. If the subsoil is lacking in warmth, it will be found fatal to apply water, even if the soil is very dry. One good watering will often mature a crop of potatoes, but, if the growth of vines is heavy and shades the ground well, two or even three waterings will increase the yield, and can, in no ordinary case, injure it. Thorough cultivation should follow each application of water, otherwise the water furrow will dry and cake, and this is most detrimental to the crop. As in the irrigation of other crops, the irrigation furrows should not be too long, because the water takes some time to go through, and the upper end, by the time the lower end has sufficient water, will have had far too much. In sandy soil water may be run for three or four hours, while in tenacious soils the irrigation may continue for eight or ten hours.

There is one very important point to note in connection with potato-growing by irrigation. Once watering has been begun, the ground should never be allowed to become dry. If this is neglected, the growth of the potato stops. Then growth is started again by a succeeding watering, with the result that the tubers will be irregular in size, or a second crop will be set, thus giving a large quantity of small or ill-shaped potatoes. This we have amply proved in a small crop of Sir John Llewellyns and Northern Stars we took up in December. The watering had been done fitfully, the ground being sometimes allowed to become quite dry. The result was that there were large numbers of small Sir Johns besides a second crop just set, whilst the Northern Stars resembled nothing so much as miniature dumb-bells, some taking the form of stumpy carrots. If potatoes are irrigated before the setting of the tubers, a greater number will be formed than the plant can properly support, few of them becoming large enough for market. On the other hand, if irrigated after the tubers have formed, there will be fewer tubers but a large crop of uniform marketable size. Deep cultivation, and thus keeping the ground mellow, is most important. The field should never be flooded, nor should the water be allowed to reach the crown or stem of the plants. The tuber is not the root of the plant, and it is the roots, not the tubers, which have to be watered. When the plants are 5 or 6 in. high, the roots are several times that length, and no more deep cultivation should be given them. It is sufficient to use some form of cultivation which will keep about 2 in. of the surface thoroughly pulverised.

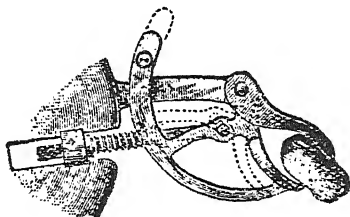
As soon as planting is done, the land having been previously well flooded if the weather is dry, harrow with the row, using bull tongues set to run as deep as possible next the row, the outside ones being set shallow. As the potatoes begin to grow,

reverse the shovels, running the outside deep and the inside ones shallow, so as not to disturb the roots. Cultivation should be continued as long as the row can be seen. It should be understood that, with irrigation, the land must be well drained or so porous that the superfluous water can easily escape. Stagnant water is fatal to any crop except rice, and especially fatal to potatoes.

Where irrigation is out of the question owing to want of sufficient water supply or to the undulating nature of the land, deep and constant cultivation and thorough pulverisation of the soil will go far towards making a heavy crop.

POTATO PLANTING MACHINES.

In America and in many parts of Europe, potatoes are now, and have been for some years, planted by machines drawn by horses, which make the drills, drop the sets into them, and cover them. In some machines, the sets are picked up by revolving spikes; in others, there is a finger-and-thumb action, which avoids piercing the sets



in the hopper. The fingers pick up the potato, hold it as the disc revolves, when a cam opens the fingers, and the potatoes drop into their places as though put in by hand. The machine will plant ordinary seed potatoes with only 5 per cent. of missed plants. The weight of the planter is about 7 cwt.

A HAND PLANTER.

This apparatus was invented in 1902 by the Hon. Cecil Jervis, Nottinghamshire. It is remarkable more for its simplicity than intricacy. The accompanying block shows at once the principle of the implement. By the old system of hand planting, 1 acre a day was very hard work for a man; but, with the Jervis Potato Planter, a man can comfortably plant 2 acres a day. Emerson says: "There would be more



tillers of the soil if the work could be brought breast-high." and the doctrine of the eminent essayist finds practical application in this appliance. Stooping is done away with, uniform work is assured, and the labourer can plant at walking speed. Three potatoes are taken at a time from a hopper slung over the shoulder, and dropped into the planter. The hopper is hollowed on one side to fit the body. The planter deposits the seed with great accuracy.

AFTER CULTIVATION.

Cultivation follows planting very closely, but interference is not needed, if the land is clean, until the haulms begin to show above the ground; then it is necessary to run a light, one-horse harrow over them, which can be safely done until the stalks are up some 2 in. above the ground, without any injury to the aftergrowth. This method will save a great deal of labour with the hoe, of which, however, there will be plenty needed before the potatoes are fit to hill. The more work that is done among the roots in the way of loosening the soil, either with hoe or scuffler, between the rows, the more likely is the farmer to get a fair return for his labour, provided always that the season be favourable. But even if the weather be dry, cultivation will be a great help to the plants by preventing evaporation of what moisture may be present in the soil. The farmer must, however, be careful to avoid disturbing the plant after the tubers are formed on the rootlets, and, therefore, he should not cultivate too closely.

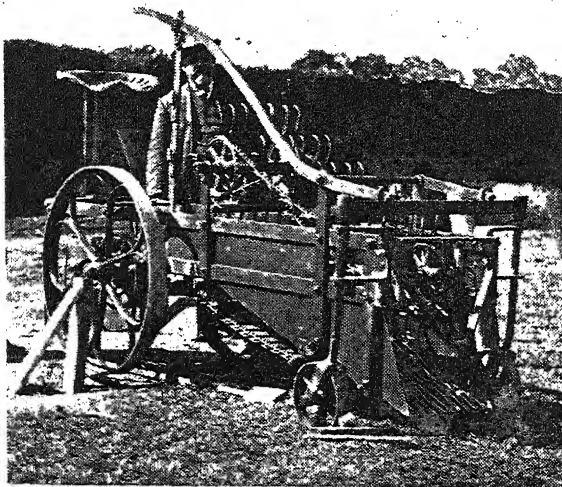
As the haulms grow higher, fresh soil must be drawn around them; in other words, they must be hilled up as the plants grow. This provides fresh plant food, supports the haulms, and keeps off superabundant moisture.

HARVESTING.

The first thing to make sure of before digging the crop is whether the tubers are sufficiently ripe to be lifted. The surest signs of maturity are the drying off of the haulms, and the firm setting of the potato skin. The winter crop may safely be left in the ground until the tubers are dead ripe, as there is little fear of any damage being done to them by flies and other insects; but the summer crop runs great risk from the potato fly and from sun heat. It is therefore advisable to take the latter up as soon as the haulms begin to wither and turn brown. The skin will not be so firmly set, and hence the potatoes will have a ragged appearance, and will not keep so well as if they had been allowed to remain in the ground until perfectly ripe.

Potatoes may either be taken up with a digging fork, with a long-handled shovel, with an ordinary plough, with a potato-digging plough, with the potato-digging machine, of which latter there are several in the market, and two—the Daniels and the Jackson—lately invented and perfected in Queensland by the inventors whose names they bear.

In the early days of potato-growing in the light scrub soils, I found the long-handled shovel a better implement than the fork, no potatoes being left in the ground; the labour also being less back-breaking. One ton a day was a fair day's work with this implement, and none of the potatoes were injured by a time of the fork being stuck into them. A swing plough will do the work more expeditiously, of course, and without the same risk of damage, but still there is always some damage done by



THE DANIELS MACHINE.

scratching the tubers; and, if the ground is at all weedy, many potatoes will be left behind, which will have to be picked up by hand when cultivating for the succeeding crop.

In the absence of a regular digging machine, perhaps the cleanest way to take up a potato crop is to strip each side of the rows and then run a light plough down their centre, turning up all the potatoes.

Of the digging machines, the lightest and easiest worked by two horses are the two abovementioned. The Jackson machine simply digs the potatoes, but does not grade them. Both machines are equal to digging 5 acres a day.

Where the land is free, and there are no weeds, such as fat-hen and thistles, the machines do excellent work, and are a great saving of labour. To make the best work, the dry top of haulms and all weeds and rubbish should be removed prior to the machine being put to work. Since the advent of the blight, even if the digging is to be done by hand, it is advisable to clear the "shaws" off, and burn to stop further infection by their coming in contact with the sound tubers after they are brought to the surface. In old times it was customary to make use of the haulms for covering heaps of roots that had to be left in the field over night. But as it is almost impossible to be certain that no small spores of disease are lurking in the haulms, even in what are considered clean crops, it is advisable to run no risks and have the tops destroyed right away, fire being the best thing if the weather will allow.

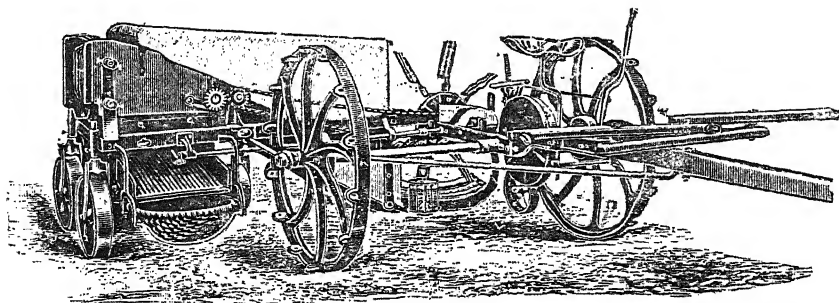
STORING POTATOES.

When handling potatoes for storing, treat them as eggs, careful handling means much as to the keeping qualities of potatoes. When extra labour has to be employed in raising potatoes, the greatest trouble is not slovenly digging; that can be rectified by after cultivation with harrow and plough. After the cleanest of diggers there will be some left, so that it is only a question of a few extra bags to be picked up when ploughing. It is in getting men to sort them as they should be where the trouble lies.

There are several methods in practice in the matter of storing potatoes; one is effected by putting a covering of some 6 in. of straw on a prepared heap of potatoes, and, on the top of the straw, laying another 6 in. of dry earth. But experience has shown that such a covering is too air-tight, causing fermentation and decay. The method I adopted was to place potatoes in a heap upon a high and dry patch of land and cover well with blady grass. By this plan, I succeeded in saving all my seed potatoes in the sixties, at Oxley Creek, when heavy rains culminated in high floods. There is another way, which is to lay them on the barn floor and cover them with straw. This covering, whether out of doors or indoors, is necessary to keep them in serviceable condition. To heap up the summer crop, when first lifted, is a great mistake, as they are sure to heat and decay. In any case, potatoes should not be heaped up whilst in a damp condition, as they will very quickly become valueless. Stored potatoes should be carefully sorted a week or so after they are taken out of the ground.

POTATO GRADER.

The accompanying illustration shows a device for rapidly and easily sorting potatoes as they are taken from the ground. The upper incline has, crosswise, rounded strips with spaces between as a flooring. As the potatoes pass down the incline, the small ones fall through the openings into the lower incline, the large tubers falling into one basket and the smaller into the other. The strips being rounded do not bruise the potatoes.



AN ENGLISH POTATO GRADER.

A DISEASE-RESISTING POTATO.

When the new varieties of potato, such as the Northern Star, Sir John Llewellyn, Up to Date, Evergood, and others were placed on the market about five years ago, as absolutely disease-proof, and as being enormously prolific, at exceedingly high prices (as much as £50 being paid for a single tuber), high hopes were entertained that disease in potatoes would be, for a series of years, at least, a memory of the past. But, alas for delusive hopes! Disease became much in evidence, especially in Northern Stars. In 1906, however, at a meeting of the Royal Horticultural Society, Edinburgh, a wellknown specialist in potato-breeding exhibited tubers of what is said to be a disease-proof potato. It was not a new variety, rather a very old one, and was supposed to be lost to cultivation; but Mr. T. A. Scarlett discovered it and brought it to light. It is said, in connection with this potato, that there is documentary evidence to show that, though grown since 1745, it has never shown the least sign of disease. It is a black, Scotch kidney, called "Trochie Grant." I have, so far, heard nothing further about this potato, either as to its cropping powers or edible qualities. The colour, of course, is not quite what is wanted in these days; but it is something to hear of a variety that has never been known to take the disease; and, with this potato to work on, hope is given that a disease-resisting variety of modern type may yet be raised. Such a potato would come as a boon to farmers and others who suffer more or less every year with disease in this important crop.

THE ALGAROBIA AND LOCUST BEANS.

Mr. W. Leslie, Inspector under the Plant Diseases Act, sends us the following useful remarks on an article we published, in the February issue of this Journal, on "Algaroba, Carob, or Locust Beans." He also sent a photograph of a bean-bearing tree—the *Pithecolobium saman*, which has a spread of branches of 300 ft., the area covered by it being 1 acre 2 roods 19 perches, which arrived too late for reproduction in this month, but will appear in the April number of the Journal.

Mr. Leslie writes:—

"With reference to article in February issue, page 71—Algaroba and Locust Beans—it may be useful to note that *Pithecolobium saman*, commonly called the 'Saman Tree' in the West Indies, is favoured there above all others as a shade and pasture tree. It possesses the following admirable qualities for this purpose:—

1. It shades a very large area.
2. The shade is not heavy enough to prevent a healthy growth of grass.
3. It roots deeply, and instead of impoverishing the surface soil it enriches it by its copious deposit of nitrogen-bearing matter in the form of decayed leaves and flowers. (It is largely due to this 'incidental increment' that grass grows richer under its shade.)
4. The leaves close up at night and admit a deposit of dew on the grass underneath.
5. The large beans (7 in. by 1 in.) are plentifully produced in the dry season and form valuable feeding for stock, their sugar-content being high.

"A photo. taken by the writer in the West Indies shows a Saman tree covering 1 acre 2 roods 19 perches."

MANGO CHUTNEY.

The following is a good West Indian recipe for making Mango Chutney:—3 lb. mangoes (turned, but not ripe), 3 lb. tamarinds, 2 lb. raisins (weighed after stoning), 8 lb. brown sugar, $\frac{1}{2}$ lb. chillies, 2 lb. green ginger, $\frac{1}{2}$ lb. garlic or $1\frac{1}{2}$ lb. onions, $\frac{1}{4}$ lb. mace, 1 oz. mustard seed, $\frac{1}{4}$ oz. cloves, $\frac{1}{4}$ oz. pimento, and $\frac{1}{2}$ lb. table salt.

Soak the tamarinds in 2 quarts of the best vinegar; stir them about with a wooden spoon to get the pulp off, and take out the seeds and the leathery part in which they are enclosed. Cut the raisins small. Peel the ginger and grate it. Pound the chillies, garlic, and mustard seed in a mortar, using a little vinegar to moisten. Mix all together thoroughly; it is then ready for use.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
F. C. G. Gratton ..	"Towlestone," Kingsthorpe	2	14	Holstein Cattle Club Herd Book
T. Mullen	"Norwood," Chelmer	3	20	Queensland Jersey Herd Book
J. H. Paten	Yandina	6	21	Ayrshire Herd Book of Queensland
Queensland Agricultural College	Gatton	4	38	Ayrshire Herd Book of Queensland
		..	2	Ayrshire Herd Book of Scotland
		2	9	Holstein-Friesian Herd Book of Australia
		2	31	Jersey Herd Book of Queensland
J. W. Paten	Wanora, Ipswich ..	10	42	Ayrshire Herd Book of Queensland
M. W. Doyle	Moggill	4	12	Queensland Jersey Herd Book
G. A. Buss	Bundaberg	1	15	Herd Book of the Jersey Cattle Society of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Milking Shorthorn Herd Book of Queensland
M. F. and R. C. Ramsay	Talgai, Clifton ..	5	27	Herd Book of the Jersey Cattle Society of Queensland
George Newman ..	Wyreema	12	47	Holstein-Friesian Herd Book of Australia
R. Conochie	Brooklands, Tingoor	9	21	Queensland Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
W. J. Barnes	Cedar Grove	10	37	Queensland Jersey Herd Book
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
W. J. Affleck	Grasmere, N. Pine ..	6	31	Queensland Jersey Herd Book
A. J. McConnel	Dugandan, Boonah	19	36	Australian Hereford Herd Book
A. Pickels	Blackland's Stud Farm, Wondai	4	62	Illawarra Dairy Cattle Herd Book of Queensland
G. C. Clark	East Talgai, Ellinthorp	3	7	New Zealand Herd Book
H. D. B. Cox	Sydney (entered brother's name)	3	16	Commonwealth Standard Jersey Herd Book
J. T. Perrett and Son	Coolabunia	2	36	Illawarra Herd Book of Queensland
State Farm	Kairi	4	8	Ayrshire Herd Book of Queensland
		1	2	Holstein-Friesian Herd Book of Australia
		45	127	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	2	22	Illawarra Herd Book of Queensland
W. T. Savage	Ramsay	50	400	Australian Hereford Herd Book
Tindal and Son	Gunyan, Inglewood	3	28	Queensland Jersey Herd Book
J. N. Waugh and Son	Prairie Lawn, Nobby	9	55	Ayrshire Herd Book of Queensland
J. H. Fairfax	Marinya, Cambooya (2)	25	100	Queensland Shorthorn Herd Book
C. E. McDougall	Lyndhurst Stud, Warwick (2)	6	20	Ayrshire Herd Book of Queensland
J. Holmes	"Longlands," Pittsworth	1	20	Illawarra Dairy Cattle Association
P. Biddles	Home Park, Netherby	1	9	Milking Shorthorn Herd Book
A. Rodgers	Torran's Vale, Lane-field	1	..	Holstein-Friesian Herd Book of Queensland
R. S. Alexander	Glenlomond Farm, Coolumboola	2	..	Holstein-Friesian Herd Book of Australia
State Farm	Warren	3	83	Ayrshire Herd Book of Queensland
S. H. Hosking	Toogoolowah	2	15	Holstein Cattle Club Herd Book
W. J. H. Austin	Hadleigh Jersey Herd, Boonah	2	11	Queensland Jersey Herd Book
Ditto	ditto .. ..	..	6	Commonwealth Standard Herd Book
H. M. Hart	Glen Heath Stud, Yalangur	7	21	Ayrshire Herd Book of Queensland
C. Behrendorff	Inavale Stud Farm, Boonah	3	9	Holstein-Friesian Herd Book of Queensland
F. A. Stimpson	Ayrshire Stud Farm, Fairfield, South Brisbane	25	77	Ayrshire Herd Book of Queensland
M. L. Cochrane	Paringa Farm, near Cairns	5	21	Ayrshire Herd Book of Australia

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—continued.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
Albert Cook ..	"Greenmount," Mackay	1	8	A.-A. Stud Book, New Zealand
Thomas Brown ..	"Bellgrove," Kingaroy	1	14	Do.
Higgins Bros. ..	Sandy Creek, Leslie, Q.	6	2	Do.
Calcino Bros. ..	"Summariva," Charleville	3	4	Do.
W. M. McKelvie ..	"Undulla," Miles ..	5	4	Do.
James Connors ..	"Glen Erin," Nanango	1	2	Do.
J. A. Mackintosh ..	"Yundah," Warwick	2	8	Do.
M. J. Luff ..	Kaimkillenbun ..	1	1	Do.
A. Spencer ..	Brisbane ..	2	1	Do.
Beak Pastoral Co. ..	Rockhampton ..	2	10	Do.
E. Swayne, M.L.A. ..	West Plane Creek ..	1	2	Holstein-Friesian Herd Book of Queensland
Godfrey Morgan ..	"Arubial," Condamine	3	6	Queensland Shorthorn Herd Book
John Anderson ..	"Fairview," Southbrook	7	34	Ayrshire Herd Book of Queensland

HOW MUCH DOES A RABBIT EAT?

Mr. R. G. Skelton, of Otley, Inverell, writing to "Sydney Stock and Station Journal," gives some interesting, not to mention astounding, figures on rabbits. They look all right on paper, but it is a matter of conjecture as to how they work out in practice. He writes:—

"Does anyone know how much feed a rabbit eats? This is my experience:

"My children caught a young one, and were playing with it in the garden, and he got under the house, and used to come into the garden at night to feed. Result was that if we hadn't laid wait and destroyed it quick and lively, the garden would have been wiped out in a week. His large appetite struck me so much that I decided to test what a rabbit would really eat.

"I caught a young one, and kept him for a few days till he settled down to feed in his box, then weighed him, and he went $6\frac{1}{2}$ oz.; then I kept the feed (radish tops and lettuce) up to him for twenty-four hours, and he ate 15 oz. in that time. (No mistake about this, and he wasn't prepared by starvation for the test either.) That is, he ate more than twice his own weight in twenty-four hours. Now, does this mean that a full-grown rabbit (which I find averages about 4 lb.) eats more than, or even twice, his own weight. If it does, then I lose 26,071 tons of feed per year by rabbits, because I reckon I have been carrying 20,000 rabbits on Otley. I consider this right, because I put a man on poisoning for a few months, and he got 7,000 full-grown skins, and easily lost another 3,000 full-grown rabbits that died off the trail. And I reckon he only got half the rabbits.

"According to this theory, I've lost 26,071 tons of feed per year by rabbits. Valuing this at least £1 10s. per ton means that on this place of 12,600 acres rabbits have eaten at least £39,106 worth of feed per annum. Makes one think a bit, doesn't it? And I hope it's enough to make rabbit-breeders swallow and digest.

"Now for another matter that might be interesting to rabbit-breeders. I came here four years ago, and I reckon the rabbits are no thicker now than they were then. As I've said, I've been feeding 20,000 rabbits, which I suppose means there were 10,000 does (females). Now, supposing each doe has at least five kittens a year, that means an increase of 50,000 rabbits per annum. Well, where have the 50,000 increase been going to? In my opinion they are destroyed by natural enemies, such as foxes, cats, &c.

"Well, there it is, gentlemen, and if you think these figures are worth driving down the throats of rabbit-breeders you are at liberty to do so."

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JANUARY, 1918.

Another very unfavourable month for egg production has been passed through. Almost continuous rain has prevailed throughout the month. The number of eggs laid for January was 6,092. E. Chester again leads in the light breeds with 144 eggs. In the heavy section R. Burns and Mars Poultry Farm are equal for first place with 113. A large number of the birds are moulting. Broodiness had not been so prevalent during the month, but the total cases amongst some of the birds, and the time taken to get over each period do not leave much time for laying. In thirteen pens in the six-hen test, forty individual birds have five or more cases of broodiness against them, whilst three birds have been broody ten times each. The following are the individual records:—

Competitors.	Breed.	Jan.	Total.
LIGHT BREEDS.			
E. Chester	White Leghorns	144	1,384
G. Chester	Do.	123	1,205
Oaklands Poultry Farm ...	Do.	116	1,176
W. R. Crust	Do.	122	1,172
*G. H. Turner	Do.	100	1,160
F. W. Leney	Do.	97	1,164
W. Becker... ..	Do.	99	1,157
*J. M. Manson	Do.	71	1,149
Kelvin Poultry Farm ...	Do.	110	1,128
T. Taylor	Do.	103	1,111
D. Fulton	Do.	109	1,091
*A. T. Coomber	Do.	89	1,090
*J. R. Wilson	Do.	90	1,089
T. A. Pettigrove, Victoria	Do.	81	1,089
Chris. Porter	Do.	80	1,076
*J. Zahl	Do.	70	1,063
Moritz Bros., S.A. ...	Do.	73	1,061
Quinn's Post Poultry Farm	Do.	83	1,042
J. G. Ritcher	Do.	106	1,041
*Mrs. J. D. R. Munro ...	Do.	72	1,025
T. B. Hawkins	Do.	88	1,013
A. H. Padman, S.A. ...	Do.	79	1,006
J. L. Newton	Do.	92	1,005
*Dixie Egg Plant	Do.	70	1,005
A. Shillig	Do.	60	1,004
J. Holmes	Do.	105	988
C. Knoblauch	Do.	94	985
Mars Poultry Farm ...	Do.	76	979
*A. W. Bailey	Do.	77	978
Mrs. W. D. Bradburne, N.S.W.	Do.	77	976
F. Clayton, N.S.W. ...	Do.	69	969
Mrs. S. J. Sears	Do.	87	967
E. Cross	Do.	89	966
L. G. Innes	Do.	98	962
*T. Fanning	Do.	53	961
S. J. White	Do.	85	958
C. H. Singer	Do.	75	941
S. C. Chapman	Brown Leghorns...	81	935
C. P. Buchanan	White Leghorns...	69	930
E. A. Smith	Do.	82	916
J. Ferguson	Do.	72	913
R. Holmes	Do.	55	912

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Jan.	Total.
LIGHT BREEDS— <i>continued.</i>			
*A. E. Walters	White Leghorns ...	75	911
Geo. Williams	Do.	62	908
Miss M. Hinze	Do.	85	907
S. Howard	Do.	55	903
Mrs. J. Carruthers	Do.	84	885
*Dr. E. C. Jennings	Do.	91	859
*C. C. Dennis	Do.	37	822
HEAVY BREEDS.			
*R. Burns	Black Orpingtons ...	113	1,272
*Mars Poultry Farm	Do.	113	1,196
W. Smith	Do.	63	1,114
E. A. Walters	Do.	65	1,101
*E. F. Dennis	Do.	94	1,065
W. S. Hanson, N.S.W.	Do.	87	1,046
F. A. Claussen	Rhode Island Reds ...	80	1,020
Mrs. J. H. Jobling, N.S.W.	Black Orpingtons ...	97	993
*E. A. Smith	Do.	82	979
H. Jobling, N.S.W.	Do.	88	966
D. Kenway	Do.	76	951
Cowan Bros., N.S.W.	Do.	72	937
P. C. McDonnell	Do.	80	934
King and Watson, N.S.W.	Do.	90	911
C. B. Bertelsmeier, S.A.	Do.	90	908
*Miss M. Hinze	Do.	92	907
*Oakland Poultry Farm	Do.	85	896
R. Burns	S. L. Wyandottes ...	81	871
J. M. Manson	Black Orpingtons ...	79	862
E. Morris	Do.	65	851
*Kelvin Poultry Farm	Plymouth Rocks ...	66	808
C. C. Dennis	White Wyandottes ...	75	804
*F. W. Leney	Rhode Island Reds ...	50	703
F. Clayton, N.S.W.	Do.	49	682
Totals ... ..	...	6,092	72,723

* Indicates that the birds are engaged in single hen test.

DETAILS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
G. H. Turner	160	170	215	223	184	217	1,169
J. M. Manson	184	209	158	175	199	224	1,149
A. T. Coomber	178	123	213	198	198	180	1,090
J. R. Wilson	200	178	169	195	164	183	1,089
J. Zahl	205	110	215	123	215	195	1,063
Mrs. Munro	224	170	143	153	129	206	1,025
Dixie Egg Plant	158	193	178	200	85	192	1,006
A. W. Bailey	36	174	198	196	192	182	978
T. Fanning	130	172	181	146	135	197	961
A. E. Walters	120	130	152	185	153	171	911
Dr. Jennings	120	100	166	155	188	130	859
C. C. Dennis	176	89	77	154	162	164	822

EGG-LAYING COMPETITION—continued.
DETAILS OF SINGLE HEN PENS—continued.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
HEAVY BREEDS.							
R. Burns	187	162	231	170	234	288	1,272
Mars Poultry Farm	180	218	195	198	207	198	1,196
E. F. Dennis	221	196	183	231	198	36	1,065
E. A. Smith	162	166	131	188	171	158	979
Miss M. Hinze	161	136	128	162	164	156	907
Oaklands Poultry Farm... ..	204	134	125	113	197	123	896
Kelvin Poultry Farm	127	123	131	179	97	146	808
F. W. Leney	121	132	104	105	114	127	703

THE TRAP-NEST.

Mr. R. T. G. Carey, the well-known poultry-breeder of the Pindora Poultry Farm, at Beerwah, North Coast Line, sends us the following interesting and valuable information concerning the advantages of trap-nesting, which will doubtless prove useful to those of our readers who are engaged in poultry-farming. He writes:—

“ With your kind permission I thought a few lines upon trap-nesting would be suitable for readers of the *Queensland Agricultural Journal*; hence my object in penning these few lines and the remark upon the important subject of trap-nesting would not be out of place.

“ In poultrydom there are a vast number of aspirants engaged in poultry-raising. Some have made it a profession; some have failed, while others have become actual experts or scientists. Yes, poultry-breeding to-day is a scientific craft, wherein the many essential details that crop up have to be performed with the same degree of exactitude as a surgeon's work in a hospital. Care, cleanliness, attendance, rationing, watering, and coping against mites, diseases and parasites, &c., have to be all studied; hence the poultry-breeders of to-day are scientists, using the new and modern inventions of appliances for hatching, foster-mothering, fattening, and trap-nesting; the last-mentioned employment, though tedious, is essential for the betterment of poultry-farming.

“ Trap-nests reveal the doings of individual hens, the identification of 300, 200, 100, 50, or 30 egg hen become known thereby, and drones if any. They prevent the egg-eater by disclosing the culprit, thereby allowing her to be fattened for the table. The trap-nest also demonstrates which members of the flock lay large-sized eggs and likewise the percentage of infertile eggs, and the bad shape, too long or very small egg layers.

“ By the aid of the trap-nesting system, breeders can vastly improve their laying strains. It is the only certain test (far outstrides Hogan's system, or Zarl's test, which are only presumptive problems that amateur fanciers would be wise to leave alone).

“ Trap-nesting is the only certain test, far in advance of the majority of systems of selection in points of accuracy. It is a long and trying job, a 365 every-day task throughout the year, records taken of tabs on fowls, eggs laid, &c., in all kinds of weather—wet, fine, floods, or drought.

“ As an illustration of the benefits of trap-nesting, I will quote the records of two of my pens during the month of January. Pen No. 1: Six yearling hens whose output for the month was 135 eggs, their individual record being as follows:—24, 23, 23, 22, 22, 21. No. 2 pen was composed of three hens and three pullets, their total score being 95 eggs. Of this number the hens laid 56 eggs as follows:—19, 14, 23. Two of the pullets laid an egg each on the first day of the month, and from that date to the 31st only gave 13 and 20 eggs respectively. The other did not start until the 6th, and finished by producing only half a dozen tiny eggs by the end of the month.

“ Thus, when the trap-nest is used, the good layers can be noted at a glance, and the undesirables and drones are speedily detected. Also, every egg being marked according to the leg band number of the hen that laid it, it can readily be noted which birds produce the greatest number of fertile or infertile eggs.

“ It is through this detective service branch of our business that all the not-up-to-standard egg-producers and layers of infertile eggs are culled. As a result, none but the best are retained; hence the success of breeders must follow.

“ Therefore, the detective service branch of poultry-farming is as essential for the maintenance of fruitful productions as is the detective service of our metropolitan towns for its useful work in repressing undesirables. We must thank our trap-nests for this faithful service.

UTILITY V. FANCY.

By J. BEARD, Poultry Instructor.

I have put this heading with utility first because just now the fancy is taking a back seat, but the utility side is very much to the front. No one will deny the fact that between the two sections there is a wide difference, and yet the two are inseparably connected. The utility breeder has much to thank the fancier for. You can hardly point to any new variety which was brought into being for the utility side alone, unless it is the Sussex fowl, but this has been improved wonderfully since the fancier got hold of it.

On the other hand, the fancy breeder has evolved many new varieties which to-day hold high places in the realm of utility.

For pride of place, I might mention the Orpingtons, Wyandottes, and Rhode Island Reds. These were brought out as all-round fowl, which would please the fancier, and yet do credit to the utility side because of their usefulness in producing eggs and their qualities as table fowls. These birds were first seen on the exhibition bench, and they created quite a sensation, and so popular have they become that one cannot find a town in any part of the State, and I might add the world, without seeing these birds. Some of them may be crude-looking creatures, but that is because they have been kept just for utility, without any knowledge of the show points. I am ready to admit that the type of some breeds is very different for the two sections. Take the Leghorn in its separate classes, while the

layer is a very active, business-looking fowl, that seen on the show bench is larger and longer in leg. But this same idea governs most breeds. If you want a good layer don't select the biggest, but take those of smaller size, which look like work, with a keen eye and sharp features.

I have known scores of men take up poultry-keeping for producing eggs alone, but the interest in the birds, and possibly a natural inclination, has soon made them into fanciers, who want to breed something better than they already possess. Such is the fascination of the fancy side, that when one gets a fowl, there is always the desire to have something better, and when breeding for show points the interest increases each season. When only producing eggs, the breakfast table is the first consideration, after which all interest ceases. The fancier goes on from year to year always hoping to improve. He watches the chicken from the shell, and sees its development, and wonders right through what it will turn out, whether just a killer of an exhibition winner. But the utility man is out for numbers, and the more he hatches the better he is pleased with himself; and then his only worry is, what will be the proportion of cockerels? True, that is poultry-keeping, but it is on a different plane from that of the fancier. The one is anxious for the moment, and then it is not important; but the keen fancier is interested all the way through, for after he has finished chicken-rearing there is the further development of the stock and the condition of them when fully feathered. The adult plumage is always interesting. A bird will be handled nearly every day to see how the feathers are coming, and whether the markings will be correct, or if the shade of colour is all right. To the fancier the whole year is one round of pleasure and fun of showing. One show the bird is a cup winner, and the next not a card. Then there is the curiosity to know what the judge was pleased with in the one case and what he did not like in the other.

The fancy world is not a bed of roses, but though we get pricked with the thorns we also get the scent sometimes. With so few shows about, the fancier has had a set-back, for some people have not the money to spare, and those who are now earning and would spend cannot find the time to devote to the birds. But it will all come back again; as soon as the Empire settles down, things will right themselves, and then the fancy will again thrive as it has done in the past.

All sections are needed, and if we work together for the common good, then it must be better for everyone.

It is idle to compare the prices of the two sections, for just now nothing is making very big figures; but in ordinary peace times the prominent fancier can make prices which would make the utility man's mouth water.

Last year several instances came before my notice of birds having been claimed in shows at prices ranging from £5 to £25, but this is only an ordinary amount in normal times. No doubt these were claimed with a view of winning at other shows, and if shows were plentiful this sort of thing would go on. Such sums in one lump are very useful, and the utility man would have to turn over a good many birds before he reached such amounts.

I may be pardoned for sticking up for the fancy, because I am an out-and-out fancier, but I also recognise that the two sections are needed to keep things going and supply the common needs of mankind.

LAYING STRAINS.

By J. BEARD, Poultry Instructor.

A fowl is a fowl, no matter whether it be just kept for producing eggs or whether it is capable of winning prizes at the leading shows of the State; thus some people sum up the position of poultry-keeping, and never seem to get beyond this idea. My friends all know that for over thirty years I have been a great exhibitor and won prizes at all the best shows in the State, so when dealing with this branch of the business I must be given the credit of knowing what's what.

The fancy side has many charms which the pure utility man knows nothing about, for the one is producing a fowl because it lays eggs while the other is breeding a bird for its beauty and what it is likely to do on the exhibition bench. Still, says the novice, all are fowls. But beyond all this there is much that both sections have done to improve their stock. While the one has gone in for beauty of plumage, brilliant colouring, and striking markings, the other has turned his

attention to seeing how many eggs he can get from each fowl, and, while his average one year may be only 120 per head, he looks forward to the time when this will reach 150; thus, to a very large extent both are working on pedigree, but with rather different ideas in view. Yet pedigree has made the industry what it is to-day. The best laying White Leghorn was not a freak found in an odd corner somewhere, but has been the result of careful mating for some years past. A stock of layers could be produced from almost any breed if the owner would care to go to the trouble. No one recommends the Indian Game as the ideal laying fowl, but in taking any six pullets of this variety some will lay better than others, and if these were persisted with, and the same idea followed of only breeding from the best layers, it would be possible to get a good supply of eggs even from the much-maligned Indian.

This is the principle which has been at the back of the Orpingtons, Wyandottes, Leghorns, and Rhode Island Reds, and brought some of these strains up to such a perfection as regards laying. Even in these one might get a flock of birds which would turn out very moderate or even poor layers. It is more a question of strain or that which is very like the pedigree, because not all are bred with the same care and accuracy. You could easily have two shorthorn cows, both nice to look at, but one will give nearly as much milk again as the other simply because she has been bred from a milking strain, and her pedigree warrants the assertion that she would turn out a good milker. The production of pedigree layers is worked out on very similar lines. One cannot breed from anything called a Leghorn and expect good results. An expert knows the difference between a good and bad layer at a glance, but there should be at the back of this the knowledge of what strain the stock is, then the thought is more convincing. I have very carefully followed the different habits of some of the same breed, and, just as there are drones in the beehive, so there are lazy fowls in the run. No two birds are exactly alike. One will be always busy looking out for any tit-bit about, and if on a paddock or run will soon eat its ordinary food and then be off to see what it can find.

The other will be always round the trough to pick up the last grain, and then may wander round to see what is about, but by this time the other bird will have caught the early worm. While the latter fowl may lay a fair share of eggs and do her part, it is the active little hen which is going to do a bit more than her share and earn you the extra profit which is to come in useful.

To breed from all fowls haphazard without considering what they have done is fatal, but the best layers should always be used for reproduction, though as soon as you do this you are building up a pedigree. If you would make sure of the number of eggs laid by each bird, the trap-nest or the single penning system is the only safeguard, for then it is easy to follow the weekly or monthly returns of each hen, and is a safe guide for next year's mating. One often unconsciously raises a strain of layers and builds up a pedigree without any special method, but there is usually a keen insight into the character of the birds, so that when mating up only the best layers are used.

Some breeders are quicker at discerning differences in hens than others. I have known people keep fowls for years, and though they get a certain number of eggs per day they could not tell you which birds laid the different eggs, nor even which ones were laying. Much can be done by ordinary observation, and anyone greatly interested in the industry will naturally find out things which another person would never see, and yet this does not imply lack of keenness to make headway. One has a natural aptitude for picking up things, and is able to grasp the conditions quicker than another; and, though the dull one may get there eventually, the other has seen through the position and made headway. Good laying fowls are bred on pedigree lines, and are not found easily from an ordinary stock at random.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH DECEMBER, 1917, TO 26TH JANUARY, 1918.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Margaret ...	Ayrshire ...	28 Dec., 1917	829	5.1	49.74	
College Bluebell ...	Jersey ...	28 June "	682	5.2	41.02	
Iron Plate ...	" ...	4 Oct. "	752	4.5	39.70	
Miss Edith ...	" ...	12 Nov. "	810	4.1	38.40	
College St. Margaret	" ...	9 Nov. "	604	5.3	37.25	
Miss Bell ...	" ...	27 June "	594	5.3	36.85	
Sweet Meadows ...	" ...	8 Aug. "	558	5.7	36.83	
Jeannie ...	Ayrshire ...	13 Dec. "	841	3.8	36.74	
Leading Lady ...	Jersey ...	26 Dec. "	755	4.2	36.64	
Hedge's Dutchmaid	Holstein ...	7 Sept. "	757	4.1	35.73	
Miss Edith ...	Jersey ...	23 Dec. "	696	4.8	33.83	
College Damsel ...	Holstein ...	12 July "	733	4.0	33.77	
Lady Annette ...	Ayrshire ...	19 Oct. "	649	4.4	33.46	
Buttercup ...	Shorthorn ...	2 June "	706	4.1	33.28	
Nina ...	" ...	6 Sept. "	775	3.7	33.21	
Auntie's Lass ...	Ayrshire ...	5 July "	826	3.5	33.04	
Netherton Belle ...	" ...	17 July "	675	4.0	31.43	
Netherhall Queen	" ...	30 June "	767	3.5	30.68	
Kate						
La Hurette Hope	Jersey ...	22 Aug. "	511	5.2	30.66	
Lady Loch II. ...	Ayrshire ...	3 June "	615	4.3	30.64	
Miss Betty ...	Jersey ...	27 Mar. "	520	5.0	30.10	
Comedienne ...	" ...	13 Dec. "	554	4.6	29.91	
Burlesque ...	" ...	8 Oct. "	496	5.2	29.86	
Lady Dorset ...	Ayrshire ...	14 Aug. "	619	4.2	29.84	
College Mermaid ...	Jersey ...	21 Aug. "	492	5.1	29.52	
Glade ...	Shorthorn ...	29 Mar. "	464	5.3	28.95	
College Ma Petite	Jersey ...	10 Nov. "	621	4.0	28.94	
Skylark ...	Ayrshire ...	24 May "	576	4.3	28.79	
Violette's Peer's Girl	Jersey ...	27 June "	566	4.4	28.41	
Songstress ...	Ayrshire ...	1 Oct. "	589	4.1	28.23	
Leonie ...	" ...	4 Sept. "	602	4.1	28.09	
Lilia ...	" ...	11 July "	644	3.7	27.87	
Thornton Fairetta	Jersey ...	30 June "	418	5.4	26.11	
College Cold Iron	" ...	7 Dec. "	562	4.0	25.89	
Glow VI. ...	Guernsey ...	9 Nov. "	668	3.2	25.60	
Miss Security ...	Ayrshire ...	27 Mar. "	531	4.1	25.44	
Princess Kate ...	" ...	28 June "	506	4.3	25.30	
Lerida II. ...	" ...	2 June "	472	4.5	24.80	
Confidence ...	" ...	25 June "	587	3.7	24.70	
Charity ...	Jersey ...	26 June "	362	5.8	24.23	
Lady Mitchell	Holstein ...	30 Sept. "	574	3.6	24.06	
Lady Doris ...	Ayrshire ...	2 April "	471	4.2	22.44	
Rosine ...	" ...	21 June "	591	3.3	22.43	

The Orchard.

STRAWBERRY CULTURE.

By ALBERT H. BENSON, M.R.A.C., Director of Fruit Culture.

As inquiries are received from time to time by the Department of Agriculture respecting strawberry culture, and as I have written nothing pertaining to this subject since my work "The Fruits of Queensland" was published in 1907, it is deemed advisable to revise what I then wrote, particularly as that publication was written more for the purpose of giving information on Queensland fruitgrowing in general, rather than specialising on any particular fruit or fruits.

THE SUITABILITY OF QUEENSLAND FOR STRAWBERRY CULTURE.

Although the strawberry is commonly considered to be better adapted to the climate of the temperate zone than to that of the semi-tropics, it is, nevertheless, the one berry fruit which can be grown to perfection in this State. Excellent fruit is produced in our Southern coastal districts and even under tropical conditions such as those existing at Townsville, when the plants are grown on alluvial soil and are well irrigated. This shows that the strawberry has a wide range in this State and that it can be grown successfully over the greater portion of our Eastern coastline and the tableland country adjacent thereto; provided there is either an adequate rainfall or, failing that, a supply of water for irrigation.

The commercial cultivation of the strawberry is, however, confined mainly to those districts possessing a regular rainfall, and extends from the Redlands Area in the South to Bundaberg in the North. When grown under suitable conditions in this district, the strawberry has proved itself to be an early and prolific bearer, able to stand a fair amount of hardship, in the shape of dry weather, and to resist the attack of insect and fungus pests to a greater or less extent.

There is a good demand for the fruit, either for immediate consumption in this and the Southern States or for conversion into jam, and, as few crops yield a quicker return, it frequently enables a beginner to make a living whilst more slowly maturing fruit crops are coming into bearing. Many a pioneer fruitgrower has to thank the strawberry for his start, as it enabled him to make a living where he would, in all probability, have failed otherwise, and what applied in the case of our pioneers still holds good with the beginners of to-day.

Many of our strawberries are of excellent quality and carry well, so that they reach their destination in the Southern States in good order when carefully handled and packed, provided the weather is not excessively warm or the fruit over soft on account of excessive rainfall. For jam purposes the fruit is excellent, and the product of some of our local factories is not excelled elsewhere in the Commonwealth.

SOILS FOR STRAWBERRIES.

Given suitable climatic conditions, strawberries will thrive in most soils, but the ideal soil for this fruit is a rich loam of medium texture, well supplied with humus, possessing perfect natural drainage, and capable of retaining moisture during dry spells—and the nearer one can get the soil to this ideal the better the results. Heavy, cold, badly-drained subsoils are not suitable, but any good loam or sandy loam, whether of scrub or forest origin, can be made to produce good berries if properly treated.

PREPARATION OF THE SOIL.

There is only one way to prepare soil for strawberry culture, and that is, *thoroughly*. Nothing else will do. In the case of virgin scrub or forest land, which is, as a rule, fairly rich in humus, the land, after it is cleared, should be broken up deeply and brought into a state of as nearly perfect tilth as possible. On virgin soil, except it is of the poorest nature, it is not necessary to apply any manure for the first crop, as there is usually an ample supply of available plant-food and humus present in such soil, but for subsequent crops, or old land, systematic manuring is very important. Old land that is at all deficient in humus should have that deficiency made good, either by the application of a heavy dressing of farmyard or stable manure, such as a load to every 4 perches, or if this cannot be obtained, then by growing a green crop such as cowpeas or other legume which has been well manured with phosphatic and potassic manures and ploughing it in. The green crop so ploughed in should be allowed to rot and, when rotten, the land should be reploughed and worked down fine. If the green crop has received a generous dressing of phosphatic and potassic manure, then there will be no need to apply any further fertilising material to the land, as a complete manuring has been given; but if not, then the soil should be treated as recommended later on.

The surface of the land should be kept as even and level as possible, and, as already stated, it should be worked down fine, so that when the young plants are set out they will take hold of the soil at once and become firmly established.

Planting strawberries on raw land, sour land, or land that has been indifferently prepared, is only courting failure, whereas, when the planting is carried out as advised, there is every chance of success.

SELECTION OF PLANTS.

Always obtain strong runners from healthy, prolific plants. The first runners next to the parent plants are to be preferred, as they are usually the most vigorous and best rooted, and, further, they come into bearing earlier; but, failing these, any well-rooted, strong, well-grown runners can be used, and although they will not fruit as soon as the first runners they will give a good yield later on, and frequently continue to bear when the earlier fruiting plants have ceased.

PLANTING.

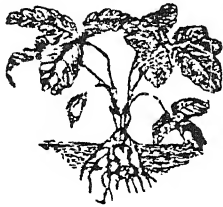
Having secured suitable plants, trim the straggling roots with a sharp knife and plant as shown in the illustrations herewith, which are



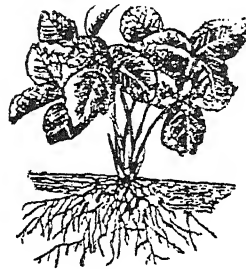
No. 1.



No. 2.



No. 3.



No. 4.

self-explanatory. Careless planting is responsible for many failures, especially too deep planting, as no strawberry will thrive if its crown is buried under the soil.

The distance at which to set out the plants varies somewhat in different districts, but it is not advisable in any case to overcrowd the plants, but to allow plenty of room. Personally, I favour planting strong plants at from 20 in. to 2 ft. apart each way, so that when planted the land can be worked all round the plant; or if row planting is desired, then the rows should be about 30 in. apart and the plants set out at from 15 to 18 in. apart in the row. The illustration of a strawberry garden at Mooloolah shows the manner of planting adopted by one of our most successful growers, and it will be noted that the plants have plenty of room and are in no way overcrowded.

CULTIVATION.

Strawberry plants must only be surface-worked whilst growing or bearing fruit. The object is to keep down weed growth and to prevent the surface of the soil caking; but the cultivation must never be so deep that it will injure the roots. The best implement to use is the Planet Junior hand cultivator or similar machine; or, failing that, a good Dutch hoe of any type that may be preferred.

Weed growth must be kept down and the surface of the soil must not be allowed to become hard and set.

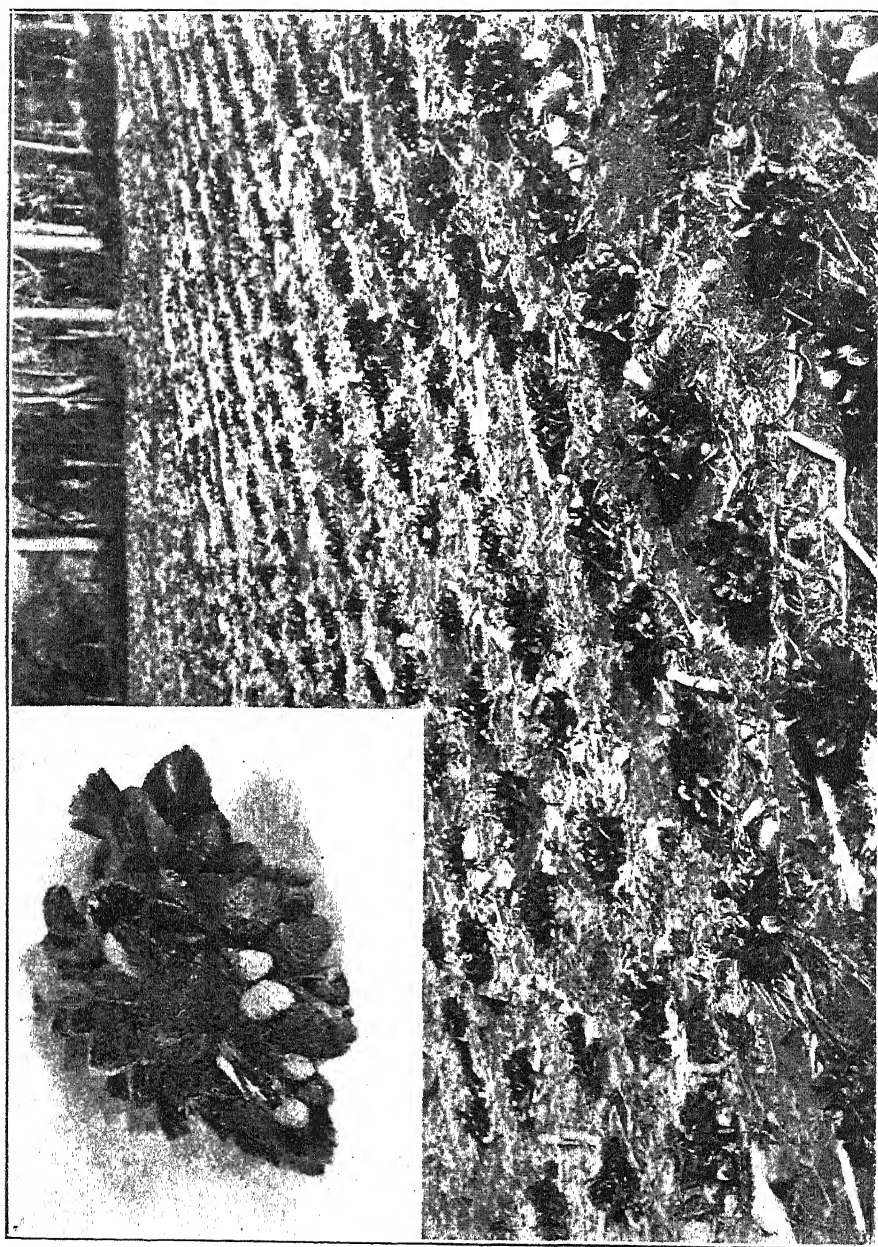


PLATE 6.—A STRAWBERRY GARDEN AT MOOLOOLAH.

If the plants are to be kept over for a second or third year, then the whole of the runners, other than those required to make good any losses in the original plants, must be removed, and the ground between the original plants must be well broken up and manured in late summer or early autumn, so that the plants will be in good nick for producing the following season's crop of fruit.

If the plants have been badly attacked by leaf blight it is a good plan to cut off all the leaves and burn them prior to working and manuring the land, as numerous fungus spores are destroyed thereby. The burning off is best done by scattering a little loose dry straw over the plants when the leaves have been cut off and have dried, and then setting fire to the lot. A light burning does not injure the plants, but is decidedly beneficial.

MULCHING.

This is seldom practical in this State, and it is of very doubtful value under our local conditions, a light surface soil mulch, such as that produced by working the land with a Dutch hoe or Planet Junior hand cultivator, being all that is necessary.

MANURING.

The strawberry is a fruit that requires an abundance of readily available plant-food, and one that pays well for systematic and judicious manuring. In the 1917 edition of his pamphlet, "Complete Fertilisers for Farm and Orchard," the Agricultural Chemist to this Department gives the following advice, which it will pay to follow:—

"Some of our coastal country, between the 26th and 28th degrees south latitude, is particularly suitable for strawberry culture, frequently producing quite phenomenal crops. Some of our rich loamy soils found in our coastal scrub lands give the best results. In poorer sandy soils the improvement effected by artificial fertilisers, particularly such containing potash, is very marked.

A complete fertiliser for strawberries should contain 7 to 8 per cent. phosphoric acid (water soluble), 8 to 10 per cent. of potash, and 3 per cent. of nitrogen, and should be used at the rate of 5 to 9 cwt. per acre.

The following fertiliser mixture may be found useful:—

3 to 5 cwt. basic or ordinary superphosphate	} per acre;
1½ to 2 cwt. sulphate of potash	
1 to 1½ cwt. sulphate of ammonia, or nitrolim, or nitrate of soda	

or,

1 cwt. fine bonemeal	} per acre;
4 cwt. superphosphate or basic superphosphate	
2 cwt. sulphate of potash	
1½ to 2 cwt. nitrate of soda	

the latter applied by two or three top-dressings, at the rate of 1 cwt. per acre, when fruit is first forming, and thereafter at intervals of 2 weeks."

MARKETING.

Fruit for immediate consumption should be gathered whilst still quite firm. It should be carefully handled and packed in boxes or trays containing a single layer of fruit. The use of punnets is not so satisfactory, as the fruit is more likely to be bruised, and it is doubtful if the methods of marketing the fruit in single layers can well be improved upon. Fruit for factory use is stemmed, placed in casks or other suitable receptacles, and forwarded as quickly as possible to the factory. Care in handling, picking, grading, or packing, always pays.

DISEASES.

The most serious diseases of the strawberry in this State are those of fungus origin—viz., leaf blight and mildew.

The former can be controlled by the use of Bordeaux or Burgundy mixture applied as a spray, combined with the burning off of affected leaves, as previously mentioned; and the latter can be kept in check by means of sulphur applied in a similar manner to that employed for the treatment of oidium in grapes, or by spraying with sodium or potassium sulphide or a weak solution of lime sulphur. Insect pests seldom do any very serious injury, but when leaf-eating beetles or other leaf-eating insects are present they can easily be destroyed by spraying with arsenate of lead.

VARIETIES.

Although most of the standard varieties of strawberries have been grown in Queensland at one time or another, experience has shown that no one variety has proved permanent, but that it has been necessary to either raise new kinds from seed or to introduce them from elsewhere. Varieties producing perfect flowers have proved more profitable than pistillate sorts and are therefore most commonly met with.

After being grown in this State for a few years most varieties become weaker in growth, more liable to disease, and less prolific, so that they have to be discarded. The introduction of new sorts is thus essential, and there is no better way of doing this than by raising local seedlings. Some of the best sorts ever grown in the State have been locally raised seedlings, of which the *Auric Anetta* and *Phenomenal* are good examples, and there is no reason why sorts equal or even superior to these should not be produced. Of the well-known standard varieties, such as *Marguerite*, *Trollop's Victoria*, *British Queen*, *Pink's Prolific*, *Federation*, *Melba*, and *Edith*, and several others that have been grown from time to time in this State, few are now planted, and those kinds that are now being grown, such as *Phenomenal*, *Usher's Special*, and *Auric*, will probably be replaced by newly raised seedlings in course of a few years. The type of strawberry best suited to this State is a vigorous healthy grower—that is, a good bearer and producer of good coloured fruit of good, firm texture and fine flavour: a fruit that keeps and carries well, and that meets the requirements of both the fresh fruit trade and of the jam maker.

ORANGE-GROWING AT CAIRNS.

Mr. Ben Mills, of Freshwater, near Cairns, has made a speciality of growing Navel oranges in his citrus orchard, and apparently has been very successful in the business. He has 13 acres under this variety of the citrus family, on which a thousand Washington Navel trees are thriving, and which are now from four to five years old. No. 1 photo. represents a general view of the orchard, and in No. 2 is depicted one of the five-year-old trees. The oranges on the box were picked on New Year's Day, and

each fruit measures $3\frac{1}{4}$ in. in diameter. There is only a small crop this year, as the trees are rather young. We wish Mr. Mills every success, as he is in the right locality for citrus culture, and has wisely chosen a most valuable and marketable variety for export.



PLATE 7.—GENERAL VIEW OF ORCHARD.

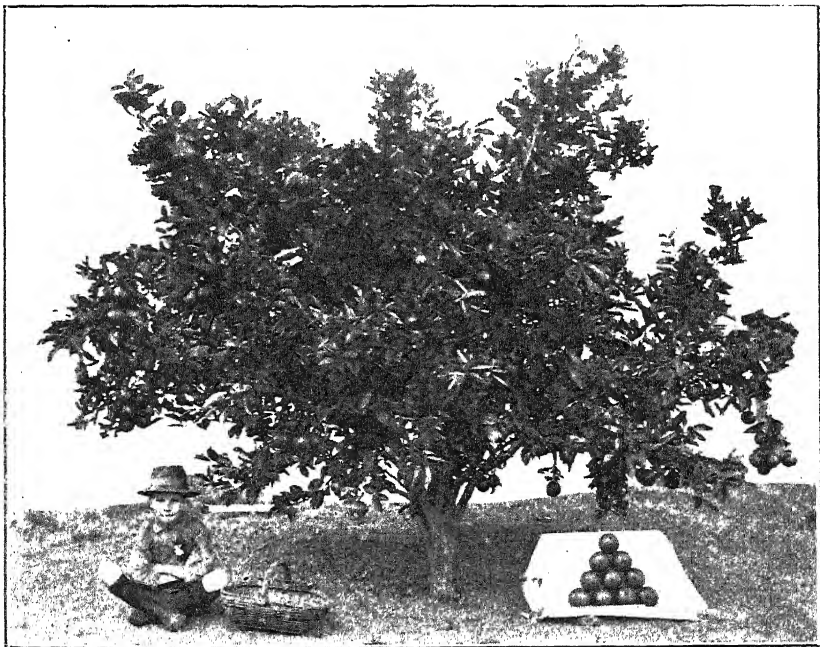


PLATE 8.—FIVE-YEAR OLD TREE.

Viticulture.

HINTS TO GRAPEGROWERS.

By C. A. GATTINO.

(Continued from February, 1918.)

SUMMER PRUNING.

This is a systematic operation, just as is the winter pruning; however, it is not sufficiently understood, and enough importance is not given to it by grapegrowers. For the better guidance of my readers, I will describe this operation in its several phases, starting with the most important.

Green Pruning.—This is the main practice, and has to be performed when the shoots are about 6 or 8 in. long, when all the small buttons or bunches can be plainly seen. The main principle of this practice consists in pinching off the barren shoots growing on the fruit-bearing branch; also all the young shoots growing on the main stem below the first fruit-bearing branch. The development of such barren shoots is not only useless, but is detrimental to the fruitful ones. By pinching them off, we not only encourage the useful growth of the plant, but lead the sap into those channels where it will benefit the development of the young bunches and the wood destined to be fruit-bearing next year.

The *pinching back* of the fruit-bearing branches, so as to prevent an excessive and useless lengthening, is a good practice for concentrating all the sap into the bunches of fruit. These branches can be pinched back to within two leaves if the shoot bears more than one bunch, and to four leaves if it only bears one. The pinching back also is effective to spurs designed to be fruit-bearing the following year. Their growth may be stopped when they are about 3 ft. long. This stoppage of growth will concentrate all the vigour into producing a strong, healthy wood for the next season's crop.

The *stripping off* of the leaves is a very useful operation, especially when the autumn temperature is very low; it would, however, be dangerous in very warm climates. This operation consists in stripping off the leaves near the bunches, and thus allowing the beneficial action of the air and light on the fruit. The time for stripping is when the leaves turn yellow, that being a sign that they have ceased to function. If time and labour are available, I would recommend that any suckers that may have grown since the first pinching off be also pinched back, as they will only develop into useless shoots.

[TO BE CONTINUED.]

Forestry.

KILLING GREEN TIMBER WITH ARSENIC.

Of late we have had many inquiries from our subscribers and others interested in clearing land expeditiously as to the method of destruction of trees by means of arsenic, and of dead stumps by acids. We are pleased to be able to give clear directions on the matter. The "Farm Bulletin" for January, 1918, published the following paper on the subject, by C. W. Burrows, Assistant Inspector of Agriculture, New South Wales, which comes at a most appropriate time:—

In this country, where large areas of land are available for occupation, and are heavily timbered, it is of primary importance to remove the timber, either wholly or in part, in order to increase the productivity of the land, and the quickest means is usually the best.

Ordinary ringbarking is effective if done at the right time for the particular district, for it must be conceded that seasons vary considerably from year to year, making the operation an adjustable one. But ordinary ringbarking has one disadvantage—it is slow, often taking twelve to eighteen months before the trees can be burnt off.

Of late years, the action of arsenic has been introduced with marked success in hastening the killing by the ringbarking process, and trees that ordinarily would take months to kill by the old method are now killed in a few weeks, and frequently in a few days, by the application of arsenic.

Arsenic—the ordinary white arsenious oxide of commerce—costing about £1 6s. per cwt., is not soluble in water to any great extent, so that soda, either the ordinary washing soda at about 5s. per cwt. or caustic soda at about £1 8s. per cwt. has to be used in conjunction with it, in order to make it soluble.

Should the ordinary washing soda be used, the proportion should be three of soda to one of arsenic, and boiling is necessary to bring about complete solubility. By using caustic soda, the proportion of which is two of caustic soda to one of arsenic, the mere addition of water in reasonable quantity generates enormous heat, doing away with the necessity of boiling for the dissolving of the arsenic.

When large amounts of the solution are required, washing soda will be the cheaper, but for small quantities of solution, caustic soda will possibly be found the handiest, as boiling is unnecessary.

In dissolving the arsenic, whether for washing or caustic soda solution, there is one point worth remembering: Do not tip the whole of the arsenic into the solution in a dry state, but mix it to a paste slowly and carefully, in the same way as the housewife treats her cornflour, then pour it slowly into the soda solution, stirring it all the time, and be careful to stand on the side away from the fumes, as they are poisonous. When once the soda and arsenic are dissolved and chemically combined the bulk may be made up to the required dilution by the addition of water.

A useful strength for quick and effective work in all kinds of timber is as follows:—

Arsenic, 1 lb.
Washing soda, 3 lb.; or caustic soda, 2 lb.
Water, 4 gallons.
Whiting, $\frac{1}{2}$ lb.

The addition of this whiting is merely that it may serve as an indicator on trees treated, as it turns white on slightly drying, making it quite certain what trees have been operated on. An empty kerosene tin makes a useful measure for dissolving in, as it holds 4 gallons.

The time to carry out the work of poisoning is when the tree is dormant—that is, when the sap movement is at its minimum and the sap right down in the roots and lower portion of the trunk. This occurs in the winter months from, say, March to July, according to the district, and must necessarily vary between these limits in a State like New South Wales which embraces such a wide variation of climate. On parts of the North Coast ringbarking has been carried out to the best advantage as late as June and early in July in certain years, whereas in the most central parts of the State, late February and March have found the sap movements at their lowest.

The main object in catching the sap to season is to prevent suckering. Trees can be killed by arsenic or ringbarking at practically any time of the year, but to prevent this suckering it is highly important to operate when the sap is down, or just completing its downward course.

Having decided on the season and dissolved the poison, we are ready to "frill" the trees. By "frilling" is meant a succession of downwards axe cuts completely round the tree, and each cut well overlapping the adjoining ones so as to leave no unsevered section of bark up which the sap can flow. There is no doubt that "frilling" alone would kill timber if allowed time, but the poison does it in a fraction of the time; in fact, trees have been killed in a few days. These cuts must be through the bark and well into the wood proper, and as close down to the ground as is convenient to cut them consistent with the shape of tree, say, from 6 to 10 in. up.

For trees of 4 ft. diameter about a quart of solution is poured into this frilling, right round the tree, using an old teapot or kettle, as the spout makes pouring easy and less is wasted by spilling needlessly round about. Smaller trees naturally need less solution.

Saplings may be cut off low down, and with a swab-stick the solution may be dabbed on to kill and prevent suckering.

It is very important that this frilling and the applying of the poison be consistently and thoroughly carried out, and not in any way scamped or slumped, if good results are to be looked for.

There need be no fear about stock being poisoned by eating the fallen or dead leaves from poisoned trees; for when is considered the comparatively small quantity of solution used, the likelihood of the leaves absorbing any free arsenic is very remote.

Nor is there much danger from stock grazing on areas frilled and poisoned, though it would be desirable to keep all stock off for three or four weeks, when all possible chance of danger would have disappeared.

At the time of writing the prices of materials for cwt. lots are:—

Caustic soda, £1 8s. per cwt.
Washing soda, 5s. 6d. per cwt.
Arsenic (grey), £1 4s. per cwt.
Arsenic (white), £1 6s. per cwt.

Prices are somewhat inflated at the present time, and, of course, a slight increase on the figures quoted will have to be paid for smaller quantities.

Although arsenite of soda is obtainable as such from drug merchants (the price quoted being £2 2s. per cwt.), its use in that form cannot be recommended for the poisoning of green timber, as it is not a definite chemical compound, and its content of arsenic and soda varies in accordance with the methods of manufacture.

The cost of the work will differ considerably in different districts. It is worthy of mention, however, that a recent report of the Manager of the new Condobolin Demonstration Farm records that poisoning was adopted there with success and economy. The work was done by day labour at a total cost of 1s. 5d. per acre. This must be considered very low, as the country was fairly heavily timbered, and the wages paid were from 1s. to 1s. 4½d. per hour. Said the manager: "The timber has all died, and mostly within forty-eight hours from the time of ringing." The liquid was distributed by means of 1½-gallon watering-cans with spouts made specially long, and having exit holes of about the size of a No. 8 wire.

DESTROYING STUMPS WITH ACIDS.

An impression has persisted among farmers for many years that tough stumps can be got rid of, or at least rotted so that they will burn freely, by treating them with some strong acid, such as sulphuric or nitric acid, and waiting a few weeks. In order to test the matter properly, a series of experiments was designed by Mr. F. B. Guthrie, chemist, in 1913, and deep auger-holes were bored in selected stumps of tough timbers, some green and some dry. Quantities of the chemicals named, separately and together in varying proportions, were poured into different stumps. The results were noted regularly for six months, at the end of which time an examination showed that in the case of both green and dry stumps the acid had no appreciable effect. The average cost per stump worked out at 1s. 9d., which included labour at the rate of 7s. per day; it is an open question whether men could be found who would use two such dangerous acids at that figure.

Saltpetre has also been said to be useful in preparing dead timber for burning off, but numerous private experiments go to disprove the theory.

Entomology.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigation from Dr. J. F. Illingworth and Mr. E. Jarvis:—

The flight of the grey-back beetles, though long drawn out, has been comparatively small this year in the region about Meringa Station. A few beetles are still emerging (14th January) and are to be found on the feeding trees, nearly two and a-half months after the first emergence in November. We are already finding second-stage grubs of this species in the field, resulting from these earlier emergences.

DESTRUCTION OF FEEDING-TREES.

As pointed out in the publications from this office, the grey-back beetles show a decided preference for feeding upon the foliage of the Moreton Bay ash. Since these trees are commonly distributed through the forest and often in the vicinity of grub-infested canefields, it would appear to be a profitable procedure to have them all cut out within a circumference of about a mile of such fields. Moreover, these trees also appear to be the favourite food-plant of both *Lepidiota frenchi* and *L. rothel*. In the region immediately around Meringa, all of these beetles appear to travel about half a-mile back into the forest, though no doubt they would travel double this distance if feeding-trees were scarce. There is also the possibility that beetles forced thus far from their breeding-ground to feed would not be likely to return to the canefield to lay their eggs, but would probably place them at the roots of native grasses in the forest, as they did before sugar-cane was introduced.

TRAP-TREES.

It might be well to keep a few trap-trees about the buildings on each farm, so that the beetles could be shaken off each morning for the fowls. We have found the weeping fig work well for this purpose, for it is usually covered with beetles every morning. The fowls feed very greedily upon the fresh beetles, with no ill effects, though they do not seem to care so much for them when dried and ground up into a meal. Of course, the natural instinct is to break up the insects themselves. The cases reported of poisoning fowls by feeding them collected beetles were evidently the result of letting the insects stand too long before they were used; hence, decay had set in and ptomaine poisons developed. Beetles to be used for food of birds and so forth should be quickly dried, and in this form they might be an important article of diet for both fowls and insectivorous animals and so on in public gardens. We have had a call for this kind of food during the last two years from zoological gardens.

LEPIDIOTA FRENCHI AND ROTHEL.

Both these beetles are still much in evidence; the mating pairs hanging on the low bushes every evening indicating that they are still emerging. After mating they feed for several days before they are ready to deposit their eggs.

In the fields, mentioned in the last report, infested with *frenchi* grubs, conditions have improved since the continuous heavy rains; the cane is greener and in some cases throwing out fresh roots. Extensive digging shows that the number of grubs is materially less and that many of them have been killed in the soil, for we often find them decayed or, if near the surface, dried up. Of course, many are carried away by ants soon after they die. Since these fields have been literally swarming with the parasitic wasps for a month or more, we naturally conclude that they have been responsible for much of this mortality among the grubs.

Experiments with poisons in this same field proved very encouraging. Arsenate of soda mixed with megass and applied in a furrow along the sides of infested stools apparently killed all the grubs, for none were to be found in the treated section three weeks after application, though they continued abundant in the remainder of the row, an average of three being found under each stool.

Experiments with repellents, on the other hand, have given but negative results. Creosote sprayed on megass and placed in furrows alongside the stools failed to retard the grubs, though the odour was very strong in the soil after three weeks. Furthermore, any roots that came in contact with the creosote fumes were killed, and the plants showed a decided yellowing.

BREEDING OF PARASITES.

Breeding experiments with regard to Scoliid parasites are being attended with marked success, and at present we are working out the life-history and metamorphosis of our two most useful species of digger-wasps—*Dielis formosus* and *Campsomoris radula*.

A specimen of the latter insect that was captured in a canefield at Meringa last September lived for seventy-five days in confinement, during which period it laid twenty-five eggs upon third-stage grubs of *Lepidiota frenchi*.

A single egg is laid on each grub and hatched after an interval of about three days, when the tiny larva at once buries its head in the body of the paralysed grub and proceeds to imbibe its juices.

So rapidly does it develop at this stage that nine days later those destined to produce female wasps have become plump white maggots nearly an inch in length and have ceased feeding.

Larvae of male wasps, although much smaller than those of the opposite sex, take just as long to mature. The shortest periods recorded by us, however, are seven days for the male and eight for the female; while nine days appears to be the average time for both sexes.

Having withdrawn its head from the shrunken, distorted body of its victim, the maggot, after resting a few hours, spins an oval, parchment-like cocoon of rough brown silk, in which it gradually changes to a pupa and finally into the perfect wasp, which escapes by breaking through a circular trap-door forming one end of the cocoon.

The average time passed in the pupal stage is thirty-six days for the male and thirty-nine for the female wasps.

We have found that *C. radula* will deposit eggs upon second-stage grubs of the grey-back beetle, but apparently will not oviposit on third-stage grubs of *Dasygnathus australis* or even paralyse them.

Data obtained recently at Meringa would lead us to suppose that this digger-wasp plays an important part in the control of *L. frenchi*.

At the present time individual females bred from cocoons at the insectary are laying two to three eggs per day. A single wasp of the above species was confined with six large grubs of *frenchi* in a cage containing 72 cubic in. of soil, and when examined twenty-four hours later two grubs had eggs on them, two were paralysed, and the remainder killed.

On the preceding day, however, the same wasp paralysed twelve grubs, laying an egg upon one; she left only three uninjured of the original fifteen placed into the cage.

Upon several occasions during early morning after rain we have observed great numbers of male wasps of *C. radula* and *D. formosus* flying energetically over the surface of land supporting young cane plants injured in places by larvae of *frenchi*. Few or no females were noticed on the wing at such times, but upon digging beneath affected stools several were unearthed together, with grubs they had paralysed.

We may therefore conclude that, although not much in evidence above ground, the females, nevertheless, are usually well represented in the field.

Such conclusion is amply borne out by our laboratory tests, since out of eighteen wasps of this species—obtained from eggs laid by a female caught at Meringa on 26th September—nine proved to be males and the same number females, and all of these parasites emerged practically together.

The male wasps have a habit of congregating in numbers at sundown, particularly during wet weather; and pass the night resting, side by side, on dead twigs, so that on certain spots one can easily collect them by handfuls.

Zoology.

A RARE MARSUPIAL.

By HEBER A. LONGMAN (Queensland Museum).

There are a number of small marsupials which are often spoken of as pouched mice or pouched rats. These belong to the same family as the well-known "native cat" or "tiger cat," *Dasyurus maculatus*, the family name being *Dasyuridae*. They are mostly very small animals, and some of the species are very uncommon. The pouch is quite unlike the large purse-like structure of the kangaroo, and is merely a circular pit, being more prominent at breeding time. Most of the species have eight mammae or teats. The young are born in a very immature state, and subsequently they are attached to the mammae in the pouch area. Through the kindness of Mr. Henry Tryon, the Queensland Museum recently received two specimens of what is probably the rarest of these pouched mice—*Sminthopsis virginiae*. These were found in scrub land, at Hampden, near Mackay, by Mr. W. A. Hussell, and were forwarded by Mr. W. Macartney. The species was first described in 1847 by De Tarragon, a French scientist, but his type is now lost. In 1883, Dr. Lumholtz found a single specimen, which was dug out of the ground at Herbert Vale, North Queensland. This is now in the Christiana Museum, and was the only example in any scientific institution until Mr. Tryon obtained these recent ones from Mackay. The plate which illustrates this article is a reproduction of Lumholtz's specimen, which appeared in the "Proceedings of the Zoological Society of London." The animal is blackish, grizzled with silver-white, and the head is reddish-grey, with a black stripe from nose to between the ears, and trace of another on the side of the snout. The head and body are about 5 in. long, the length of the tail being about the same.

Sminthopsis virginiae has no less than forty-six teeth, and is thus readily distinguished from an ordinary true rat or mouse, in which there are only sixteen. The canine teeth are remarkably long for the size of the head. The other proportions of the animal may be gauged from the illustration.

Although this little marsupial is so rare, certain other species of *Sminthopsis* and *Phascologale* (an allied genus) are not infrequently found. A specimen of the smallest of these, *Phascologale minutissima*, was recently forwarded alive, with six young, from the Pittsworth district, by Mr. P. M. Bayley, M.L.A. The mother and her family could be accommodated within an ordinary fowl's egg-shell.

During the few days in which the mother remained alive in the Museum she accounted for a surprising number of cockroaches and beetles which were given to her. The young were just old enough to leave their mother occasionally, and they would also cling at times to the fur on her back, holding on by the mouth whilst she scrambled about. Unfortunately they all died within a week.



PLATE 9.—*Sminthopsis virginiae*, *De Tarr.* (A Pouched Mouse.)

So long ago as 1896, Mr. H. Tryon pointed out, in the annual report of the Agricultural Department, that these pouched mice are of economic interest because of their insect-eating habits. He also suggested that if the common species could be bred in captivity, and liberated in numbers, they might even serve as valuable allies in the campaign against the cane-grub. Anyone who has noted the large appetites of these marsupials in captivity will realise that there is some ground for Mr. Tryon's remarks, but it seems doubtful whether successful breeding could be carried on, and in their wild state they are probably preyed upon by a number of enemies.

The largest species of *Phascologale* is the so-called brush-tailed pouched rat, the head and body of which are about 10 in. in length. The tail is long and thick, with a terminal brush. This marsupial apparently feeds on small birds and mammals, and is also accused of destroying poultry. Certain other species have curious enlarged tails, which probably contain reserve fats.

The species of *Sminthopsis* may be characteristically distinguished from those of *Phascologale* by the possession of very slender and delicate feet.

PRICKLY-PEAR AS A FODDER.

By R. J. O'SULLIVAN.

The following paper on the feeding of stock on prickly-pear was published some time ago in this Journal, and attracted considerable attention, but we have not of late heard of any general adoption of the methods here given.

"Re the above, I have pleasure in relating my experience, which, although only on a small scale, will prove that the prickly-pear is excellent for feeding cattle, and has the additional merit of being cheap. In the beginning of the big drought of 1902-3 I was living at Corinda, and a friend of mine, who is a surveyor in the Railway Department, suggested that we try prickly-pear for feeding our cows. I agreed, and we got two of the local men to join in with us. We got a truckload of pear, as we wanted it, by rail from Nudgee, and divided it between us. To feed my cow, the course I adopted was as follows:—I put as much pear as I could cram into a kerosene tin and then filled the tin with water; I then put the tin on the stove, and after allowing the water to simmer for a couple of hours I poured the liquid into another kerosene tin which contained about a quart of bran and one-third of a tin of lucerne chaff. Next morning I gave this to my cow, with the leaves, which were boiled, and although I experienced some trouble in inducing my cow to taste it, still once she tasted it she ate it afterwards most willingly. When I first started I used to cut off the big spikes, but I found some I overlooked, and which after being boiled were quite soft. After that I boiled spikes and all. I gave a similar feed every evening. My share of the pear lasted me over a month, and I am certain it did not cost me 10s. for the pear I used. I particularly noticed that—although I doubled the quantity of lucerne when I ran out of the pear—if I had to wait a week or so for the fresh supply my cow fell away in the milk, and came up again when I returned to the pear. A gentleman whom I casually met in the train informed me that he was feeding quite a number of cows on boiled prickly-pear; but, as he believed it would form a ball in the stomach, he intended selling them when the drought was over. With regard to the 'ball in the stomach' theory I am quite satisfied there is nothing in it, as I kept that cow for years afterwards, and I am certain it would have been hard to have found a more healthy cow.

"I advised a well-known Sandgate milkman, who had the pear growing up against his fence, to try my method of using the pear, and he told me afterwards that he found it good. I may say that this man thought he would improve on my way, and also save water, by putting it through the chaffcutter, but he found his idea not feasible, as the pear, being greasy, clogged his machine. It often occurred to me, when I noticed the excessive, in fact, almost prohibitive, price of lucerne chaff, to publish in the Press my experience, but I refrained from doing so, as I dislike publicity; however, at a time like the present, I consider it is the duty of everyone to publish any information which may be useful."

General Notes.

SHOW DATES, 1918.

Gayndah.—Pastoral, Industrial, Agricultural, and Horticultural Association. Show dates: 2nd, 3rd, and 4th July, 1918.

Philpot Creek.—Philpot Farmers' Society. H. J. Brown, Secretary.

Rockhampton.—Rockhampton Agricultural Society. Show dates: 20th, 21st, and 22nd June.

Kilkivan.—Kilkivan Agricultural, Pastoral, and Industrial Association.

Kileoy.—Kileoy Pastoral, Agricultural, and Industrial Society. A. R. Hooper, Secretary.

Charleville.—Central Warrego Pastoral and Agricultural Association. Show dates: 7th and 8th May. L. O. Easton, Secretary.

Wallumbilla.—Wallumbilla Agricultural and Pastoral Association. James H. Fitzpatrick, Secretary.

Herberton.—Herberton Mining, Pastoral, and Agricultural Association. — Brownlee, Secretary. Show dates: 1st and 2nd April.

Mount Gravatt.—Mount Gravatt and District Agricultural, Horticultural, and Industrial Society. Show date: 14th September.

Wellington Point.—Wellington Point Agricultural, Horticultural, and Industrial Association. E. Becklup, Secretary. Show date: 20th July.

Beerwah.—Beerwah and Coochin Creek District Fruitgrowers and Farmers' Progress Association. E. F. Jones, Secretary.

Charters Towers.—The Towers Horticultural Society. Show dates: 21st and 22nd Ipswich.—The Queensland Pastoral and Agricultural Society. Show dates: 22nd and 23rd May, 1918.

The Secretary of the Biggenden Agricultural and Pastoral Society of Southern Queensland notifies that the Annual Show fixed for the 27th and 28th of June, 1918, has been abandoned.



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SOUTHERN FRUIT MARKETS.

Article.	FEBRUARY.	
	Prices.	
Bananas (Queensland), per crate	9s. to 12s.	
Bananas (Tweed River), per crate	14s.	
Bananas (Fiji), per bunch	5s. to 6s.	
Bananas (G.M.), per bunch	5s. to 7s.	
Lemons (local), per bushel case ... ..	...
Mangoes, per case	4s. to 5s.	
Mandarins, per case ... ..	...
Oranges (Navel), per case	10s. to 14s.	
Oranges (Queensland), per case ..	6s. to 7s.	
Papaw Apples, per half-bushel case	6s. to 7s.	
Passion Fruit, per half case	4s. to 8s.	
Pineapples (Queens), per double case	10s. to 14s.	
Pineapples (Common), per double case	7s. to 9s.	
Tomatoes (Queensland), per half-bushel case	1s. 6d. to 3s.	
Cucumbers, per bushel case ... ..	...
Strawberries, per lb. ... ..	...

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	FEBRUARY.	
	Prices.	
Apples, Eating, per case	2s. 3d. to 4s. 6d.	
Apples, Cooking, per case	2s. 0d. to 5s.	
Apricots, per case ... ..	...
Bananas (Cavendish), per dozen	3d. to 5d.	
Bananas (Sugar), per dozen	3½d. to 4d.	
Cape Gooseberries, per quarter-case ... ..	...
Cherries, per box ... ..	...
Citrons, per hundredweight	10s.	
Cocoanuts, per sack	15s. to 25s.	
Cumquats, per quarter-case ... ..	...
Grapes, per lb. ... ..	...
Lemons (Lisbon), per quarter-case	8s. to 12s. 6d.	
Mandarins, per quarter-case ... ..	...
Mangoes, per quarter-case	2s. to 7s. 5d.	
Oranges (Navel), per quarter-case ... ..	...
Oranges (Seville), per hundredweight ... ..	...
Oranges (other), per case ... ..	...
Papaw Apples, per quarter-case	1s. 9d. to 2s. 3d.	
Passion Fruit, per half-bushel case	2s. to 5s.	
Peaches, per half-bushel case	2s. to 3s. 6d.	
Pears, per half-bushel case ... ..	...
Peanuts, per lb.	3d. to 5d.	
Persimmons, per half-case	1s. 6d. to 3s.	
Pineapples (Ripleys), per dozen	9d. to 2s. 3d.	
Pineapples (Rough), per dozen	6d. to 1s. 6d.	
Pineapples (Smooth), per dozen ... ..	...
Plums, per quarter case	4s. to 8s. 6d.	
Rockmelons, per dozen ... ..	...
Strawberries, per dozen boxes ... ..	...
Tomatoes, per quarter-case	2s. to 7s. 6d.	
Watermelons, per dozen ... ..	...

TOP PRICES, ENOGGERA YARDS, JANUARY, 1918.

Animal.	JANUARY.	
	Prices.	
Bullocks	£21 15s. to	£27 2s. 6d.
Cows	£16 10s. to	£18 5s.
Cows (Single)
Merino Wethers	49s.
Crossbred Wethers	48s.
Merino Ewes	41s.
Crossbred Ewes	44s.
Lambs	37s.
Pigs (Backfatters)
Pigs (Baconers)	74s.
Pigs (Porkers)	50s.
Pigs (Slips)	19s. 6d.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JANUARY, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JANUARY, 1918 AND 1917, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Jan.	No. of Years' Records.	Jan., 1918.	Jan., 1917.		Jan.	No. of Years' Records.	Jan., 1918.	Jan., 1917.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton	13.63	15	15.94	3.75	Nambour	9.44	20	15.14	5.43
Cairns	17.17	34	13.73	5.57	Nanango	4.52	34	7.69	7.98
Cardwell	17.24	44	25.07	10.01	Rockhampton	9.05	29	34.36	5.27
Cooktown	15.32	40	8.53	7.23	Woodford	7.13	29	15.79	9.90
Herberton	10.02	29	14.81	6.78	<i>Darling Downs.</i>				
Ingham	16.84	24	27.25	11.02	Dalby	3.28	46	5.13	3.64
Innisfail	21.83	35	16.48	10.31	Emu Vale	3.25	20	4.17	5.09
Mossman	16.75	5	17.08	6.21	Jimbour	3.88	28	5.09	4.01
Townsville	11.52	45	27.75	20.97	Miles	3.99	31	4.74	3.72
<i>Central Coast.</i>					Stanthorpe	3.70	43	3.72	3.20
Ayr	11.70	29	31.13	21.80	Toowoomba	5.12	44	6.15	4.76
Bowen	9.59	45	46.57	12.76	Warwick	3.73	29	3.17	3.90
Charters Towers	5.33	34	12.07	14.72	<i>Maranoa.</i>				
Mackay	14.02	45	85.09	10.26	Roma	3.44	42	8.93	3.01
Proserpine	16.37	13	58.90	19.95	<i>State Farms, &c.</i>				
St. Lawrence	9.38	45	49.44	4.28	Bungeworogai	2.62	5	8.76	2.58
<i>South Coast.</i>					Gatton College	4.43	17	7.36	4.81
Biggenden	5.51	17	9.32	...	Gindie	3.28	17	21.59	4.50
Bundaberg	9.45	33	17.90	9.05	Hermitage	2.76	10	3.79	4.50
Brisbane	6.31	67	7.70	9.07	Kairi	9.49	5	18.30	4.06
Childers	8.37	21	13.89	5.28	Kamerunga	18.41	26	9.08	3.60
Crohamhurst	13.02	25	20.20	10.32	Sugar Experiment Station, Mackay	14.82	19	78.17	11.80
Esk	5.60	29	7.54	7.01	Warren	8.53	5	34.31	5.33
Gayndah	4.84	45	9.83	6.77					
Gympie	6.75	46	11.17	4.48					
Glasshouse M'tains	9.43	8	...	7.56					
Kilkivan	5.76	37	13.06	4.27					
Maryborough	7.46	45	14.07	5.90					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for January this year, and for the same period of 1917, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

Orchard Notes for April.

THE SOUTHERN COAST DISTRICTS.

The gathering and marketing of citrus fruit, as well as of pines, bananas, custard apples, persimmons, &c., is the principal work of the month. In the Notes for March attention was drawn to the necessity for keeping all pests in check, particularly those attacking the ripening fruit. As it is the height of folly to look after the orchard thoroughly during the growing period of the crop and then to neglect the crop when grown, every possible care must be taken to keep fruit fly, peach moth, black brand, or other pests that destroy or disfigure the fruit in check, and this can only be accomplished by combined and systematic action. Citrus fruit at this time of the year often carries badly, as the stem is tender, easily bruised, full of moisture, and, consequently, very liable to the attacks of the blue mould fungus, which causes specking. The loss from this cause can be lessened to a considerable extent by carefully attending to the following particulars:—

- 1st. Never allow mouldy fruit to hang on the trees or to lie about on the ground. It should be gathered and destroyed, so that the countless spores which are produced by the fungus shall not be distributed broadcast throughout the orchard, infesting many fruit, and only waiting for a favourable opportunity, such as an injury to the skin by an insect or otherwise, combined with favourable weather conditions (heat and moisture), to start into growth.
- 2nd. Handle the fruit carefully to prevent bruising. Cut the fruit, don't pull it, as pulling is apt to plug the fruit—that is to say, to either pull the stem out or injure the skin round the stem—and a fruit so injured will go mouldy.
- 3rd. Sweat or dry the fruit thoroughly; if the weather is humid, laying the fruit out in the sun on boards or slabs is a very good plan.
- 4th. After sweating, examine the fruit carefully, and cull out all bruised or punctured fruit, and only pack perfectly sound dry fruit. It is better for the loss to take place in the orchard than for the loss to take place in the case in transit.
- 5th. If the mould is very bad, try dipping the fruit for a few seconds in a 2 per cent. solution of formalin. This will kill the spores, and if the fruit is placed in the sun and dried quickly before packing there will not be much chance of its becoming reinfested.

Don't gather the fruit too green, especially such varieties as the Beauty of Glen Retreat Mandarins, as immature fruit spoils the sale of the good article.

If the orchard has not been cleaned up after the summer rains, do so now; and do any other odd jobs that may be required, such as mending fences, grubbing out dead or worthless trees, cleaning out drains, &c.

Strawberry planting may be continued, and where new orchards are to be planted continue to work the soil so as to get it into the best possible tilth.

THE TROPICAL COAST DISTRICTS.

Clean up the orchards after the rainy season. Look out for scale insects, and cyanide or spray for same when necessary.

Go over the trees carefully, and when there is dead wood or water sprouts remove them. If bark fungus is showing, paint the affected branches with sulphur and lime wash. Clean up bananas, pineapples, and other fruits, as after the end of the month it is probable that there will not be any great rainfall, so that it is advisable to keep the ground well cultivated and free from weeds, so as to retain in the soil the moisture required for the trees' use during the winter months. Keep bananas netted; destroy guavas wherever found.

THE SOUTHERN AND CENTRAL TABLELANDS.

If the orchards and vineyards have not already been cleaned up, do so. Cultivate or plough the orchard, so as to get the surface soil into good tilth, so that it can absorb and retain any rain that falls, as even though the trees will simply be hardening off their summer's growth of wood, it is not advisable to let the ground dry out. When citrus fruits are grown, attend to them in the manner recommended for the Southern Coast Districts; and when grown in the dry parts, keep the land in a state of good cultivation. Should the trees require it, a light watering may be given. Do not irrigate vines; let them ripen off their wood.

Farm and Garden Notes for April.

FIELD.—The wheat land should now be ready for sowing the early wheats, and that which has not been prepared should be ploughed without delay. April, May, and June at latest being the months for sowing. The main potato crop, planted in February and March, will now be ready for a first or second hilling up. The last of the maize crop will now have been got in. Where cotton is grown, the pods will now be opening, and advantage should be taken of dry weather to get on with the picking as quickly as possible. Picking should not be begun until the night dew has evaporated nor during rain. Sorghum seed will be ripe. Tobacco also will be ripening, and either the leaves or the whole plant harvested. Lucerne may be sown, as the growth of weeds has now slackened off, but the ground must be thoroughly prepared and cleaned. Sow oats, barley, rye, wheat, mangolds, and Swede turnips. Plant out *paspalum* roots. Seed wheat of whatever variety soever should be dipped in a solution of sulphate of copper (bluestone) in the proportion of 1 lb. of sulphate to 24 gallons of water. The seed may also be treated with hot water by plunging it in a bag into hot water at 120 degrees Fahr. for a minute or two, and then into water heated to 135 degrees Fahr. Allow it to remain in this for ten minutes, moving it about all the time. Then plunge the seed into cold water and spread out to dry. This plan is useful in districts where bluestone may not be obtainable. Another safeguard against bunt, smut, black and red rust is to treat the seed with formalin at the rate of 1 lb. of formalin to 40 gallons of water. It is colourless and poisonous, and should be kept where no children or persons ignorant of its nature can have a chance of obtaining it. To treat the seed, spread it on a wooden floor and sprinkle the solution over it, turning the grain over and over until the whole is thoroughly wetted. Then spread it out to dry, when it will be ready for sowing. Instead of sprinkling, dipping may be resorted to. A bushel or so of seed is placed in a bag and dipped in the solution. During five minutes the bag is plunged in and out, and then the seed is turned out to dry. Formalin is less injurious to the grain than bluestone, but, while the latter can be used over and over again, formalin becomes exhausted. It therefore follows that only the amount required for immediate use for sprinkling should be prepared. Do not sow wheat too thickly. Half a bushel to the acre is sufficient—more on poor land and less on rich soils. On light sandy soil the wheat should be rolled. On sticky land it should only be rolled when the land is dry, otherwise it will cake, and must be harrowed again after rolling. When the wheat is 6 in. high go over it with light harrows. If the autumn and winter should prove mild and the wheat should lodge, it should be kept in check by feeding it off with sheep.

KITCHEN GARDEN.—Hoe continually among the crops to keep them clean, and have beds well dug and manured, as recommended last month, for transplanting the various vegetables now coming on. Thin out all crops which are overcrowded. Divide and plant out pot-herbs, giving a little water if required till established. Sow broad beans, peas, onions, radish, mustard and cress, and all vegetable seeds generally except cucumbers, marrows, and pumpkins. Early celery should be earthed up in dry weather, taking care that no soil gets between the leaves. Transplant cauliflowers and cabbages, and keep on hand a supply of tobacco waste, preferably in the form of powder. A ring of this round the plants will effectually keep off slugs.

FLOWER GARDEN.—The operations this month will depend greatly on the weather. If wet, both planting and transplanting may be done at the same time. Camellias, gardenias, &c., may be removed with safety. Plant out all soft-wooded plants such as verbenas, petunias, penstemons, &c. Sow annuals, as carnations, pansy, mignonette, daisy, snapdragon, dianthus, stocks, candytuft, phlox, sweet peas, &c. Those already up must be pricked out into other beds or into their permanent positions. Growth just now will not be too luxuriant, and shrubs and creepers may be shortened back. Always dig the flower beds rough at first, then apply manure, dig it in, and after this get the soil into fine tilth. Land on which you wish to raise really fine flowers should have a dressing of bonedust lightly turned in. Wood ashes also form an excellent dressing for the garden soil. Prune out roses. These may be planted out now with perfect success. Take up dahlia roots, and plant bulbs as recommended for March. Layers that have made sufficient roots should now be gradually severed from the plant, and left for a fortnight before potting, to ripen the young roots.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE

1918.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		PHASES OF THE MOON.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	4:57	6:46	5:21	6:41	5:41	6:19	5:58	5:46	<p>The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.</p> <p>h. m.</p> <p>5 Jan. ☾ Last Quarter 9 49 p.m.</p> <p>13 " ● New Moon 8 36 a.m.</p> <p>20 " ☾ First Quarter 12 38 "</p> <p>27 " ○ Full Moon 1 14 p.m.</p> <p>The Moon will be at Perigee on 15th, Apogee on 3rd and 31st.</p>
2	4:58	6:46	5:22	6:41	5:41	6:18	5:59	5:45	
3	4:59	6:46	5:23	6:40	5:42	6:17	5:59	5:44	
4	4:59	6:46	5:24	6:40	5:43	6:16	6:0	5:43	
5	5:0	6:46	5:25	6:39	5:44	6:15	6:0	5:42	
6	5:1	6:47	5:25	6:39	5:45	6:14	6:1	5:41	<p>4 Feb. ☾ Last Quarter 5 52 p.m.</p> <p>11 " ● New Moon 8 5 "</p> <p>18 " ☾ First Quarter 10 57 a.m.</p> <p>26 " ○ Full Moon 7 35 p.m.</p> <p>The Moon will be at Perigee on 12th, Apogee on 25th.</p>
7	5:2	6:47	5:26	6:38	5:45	6:13	6:1	5:39	
8	5:3	6:47	5:27	6:37	5:46	6:12	6:2	5:38	
9	5:3	6:47	5:28	6:36	5:46	6:11	6:2	5:37	
10	5:4	6:48	5:29	6:35	5:47	6:10	6:3	5:36	
11	5:5	6:48	5:29	6:35	5:47	6:9	6:3	5:35	<p>6 Mar. ☾ Last Quarter 10 44 a.m.</p> <p>13 " ● New Moon 5 52 p.m.</p> <p>19 " ☾ First Quarter 11 30 "</p> <p>28 " ○ Full Moon 1 33 "</p> <p>The Moon will be at Perigee on 13th, Apogee on 27th.</p>
12	5:6	6:47	5:30	6:34	5:48	6:8	6:4	5:34	
13	5:6	6:47	5:31	6:33	5:48	6:7	6:4	5:33	
14	5:7	6:47	5:32	6:32	5:49	6:6	6:5	5:32	
15	5:8	6:47	5:32	6:32	5:49	6:5	6:5	5:31	
16	5:9	6:47	5:33	6:31	5:50	6:3	6:6	5:30	<p>4 April ☾ Last Quarter 11 33 p.m.</p> <p>11 " ● New Moon 2 34 "</p> <p>18 " ☾ First Quarter 2 8 "</p> <p>26 " ○ Full Moon 6 5 "</p> <p>The Moon will be at Perigee on 10th, Apogee on 23rd.</p>
17	5:9	6:47	5:34	6:30	5:50	6:2	6:6	5:29	
18	5:10	6:47	5:35	6:29	5:51	6:1	6:7	5:28	
19	5:11	6:47	5:35	6:28	5:51	6:0	6:7	5:27	
20	5:12	6:46	5:36	6:28	5:52	5:59	6:8	5:26	
21	5:13	6:46	5:37	6:27	5:52	5:58	6:8	5:25	<p>At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane.</p> <p>At Roma the times of sunrise and sunset may be roughly arrived at by adding 17 minutes to those given above for Brisbane.</p> <p>The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.</p> <p>It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.</p> <p>[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]</p> <p>For the sunrise and sunset at Rockhampton, Townsville, Cairns, and other places in Queensland, readers may be referred to the "Queenslander" to which newspaper monthly astronomical notes will be supplied.—D.E.</p>
22	5:13	6:46	5:37	6:26	5:53	5:57	6:8	5:24	
23	5:14	6:45	5:38	6:25	5:53	5:56	6:9	5:23	
24	5:15	6:45	5:38	6:24	5:54	5:55	6:9	5:23	
25	5:16	6:45	5:39	6:23	5:54	5:54	6:10	5:22	
26	5:16	6:44	5:39	6:22	5:55	5:52	6:10	5:21	
27	5:17	6:44	5:40	6:21	5:55	5:51	6:11	5:20	
28	5:18	6:43	5:40	6:20	5:56	5:50	6:11	5:19	
29	5:19	6:43	...	...	5:57	5:49	6:12	5:18
30	5:19	6:42	...	...	5:57	5:48	6:12	5:18
31	5:20	6:42	...	...	5:58	5:47	...	...

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset may be roughly arrived at by adding 17 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

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QUEENSLAND AGRICULTURAL JOURNAL

VOL IX.

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PART 4.

Agriculture.

SEED WHEAT FOR DISPOSAL.

For a number of years wheat-breeding and the evolution and testing of new varieties of wheat have been carried out by the Department of Agriculture and principally at the Roma State Farm.

Comparative tests of standard varieties approved in other States have also been made. A selection from the two groups herein mentioned was made last season; the wheats being tested under field conditions in several districts of the State. Results indicate that these particular varieties deserve attention on the part of wheatgrowers. For this reason it has been decided to offer limited quantities for sale to *bona-fide* growers at 5s. 6d. per bushel (after cleaning and grading), f.o.r., Hermitage.

Orders for the undermentioned varieties (illustrated and described elsewhere in the Journal) should be sent on to the Under Secretary for Agriculture and Stock, Brisbane, accompanied by the necessary remittance. Applications will be treated according to priority, but it has been decided (in order to make the distribution as widespread as possible) to limit the quantity for any one applicant to 9 bushels in all. The grain is to some extent "weathered" through continuous rains interfering with harvesting operations, but official germination tests made show that the quality of the grain in this respect is quite satisfactory.

Crossbred Wheats.—Soutter's Early, BXF 37, BXF 86A, X 343-13, BXD-66, BX1P-12.

Approved Varieties from Other States.—Lotto, Warren.

Of Queensland Origin.—Amby, Piastre, Coronation, Bunge.

Soutter's Early.—A very early though sparse stooling wheat suitable for medium-late and late sowing on rich soils; short strawed and carries very little flag; straw slender but tough; heads medium length, not bearded; compact; glumes very slightly coloured, smooth; grain small, plump, and bright. This variety originated at Roma State Farm, where it has given good results, yielding up to 37½ bushels per acre. Owing to its early maturing habit and freedom from flag it escapes rust to a remarkable degree.

Warren.—A late mid-season variety suitable for early and main sowings, particularly on light soils; carrying a somewhat heavy flag and of fair stooling qualities; straw stout. Chaff smooth, white, and set firmly on the grain. Heads long and compact, slightly tapering, not bearded. Grain white, somewhat soft and starchy, long and rather over medium size when grown under good conditions. Is fairly rust-resistant, but is bunt-labile. An excellent hay wheat, and also of fair milling quality. An average of three years at Roma State Farm gave 22.9 bushels per acre.

BXF 864.—A selection obtained from crossing Bunge and Federation. A free-stooling variety of medium height, suited for early sowing. Flag somewhat light, straw white, fine, but inclined to toughness. Heads long, closely set, not bearded, chaff smooth and of a delicate brown colour. Grain medium sized, smooth skin, and slightly yellow in colour.

Crossbred 343-13.—A selection made at Roma State Farm from this crossbred. Is a mid-season variety of medium-stooling habits, carrying a moderate amount of flag, suitable for main and medium late sowing. Straw fine, but fairly tough. Heads of medium length, slightly open, non-bearded. Chaff smooth and white in colour. Grain small, bright, and smooth-skinned, shallow crease. This variety gave universally satisfactory results in all test plots throughout the South-Western District. Yielded up to 33.7 bushels at Roma State Farm.

BYD 66.—A selection from a cross between Bunge and Durum which appears to be suited to the conditions of the South-Western District. A mid-season wheat of moderate stooling habits carrying little flag, suitable for main and medium late sowings. Straw fine and of medium toughness. Head compact, of medium length, non-bearded; chaff white. Grain medium length, plump, light brown in colour, and fairly hard.

BXF 37.—A selection from a Bunge-Federation cross. A mid-season variety suitable for early sowing, of moderate stooling habits, carries a medium quality of flag. Straw moderately stout. Head long and compact. Chaff smooth, light brown in colour. Grain medium sized, somewhat rough skinned, white in colour. This variety has given a yield of 37.2 bushels at Roma State Farm.

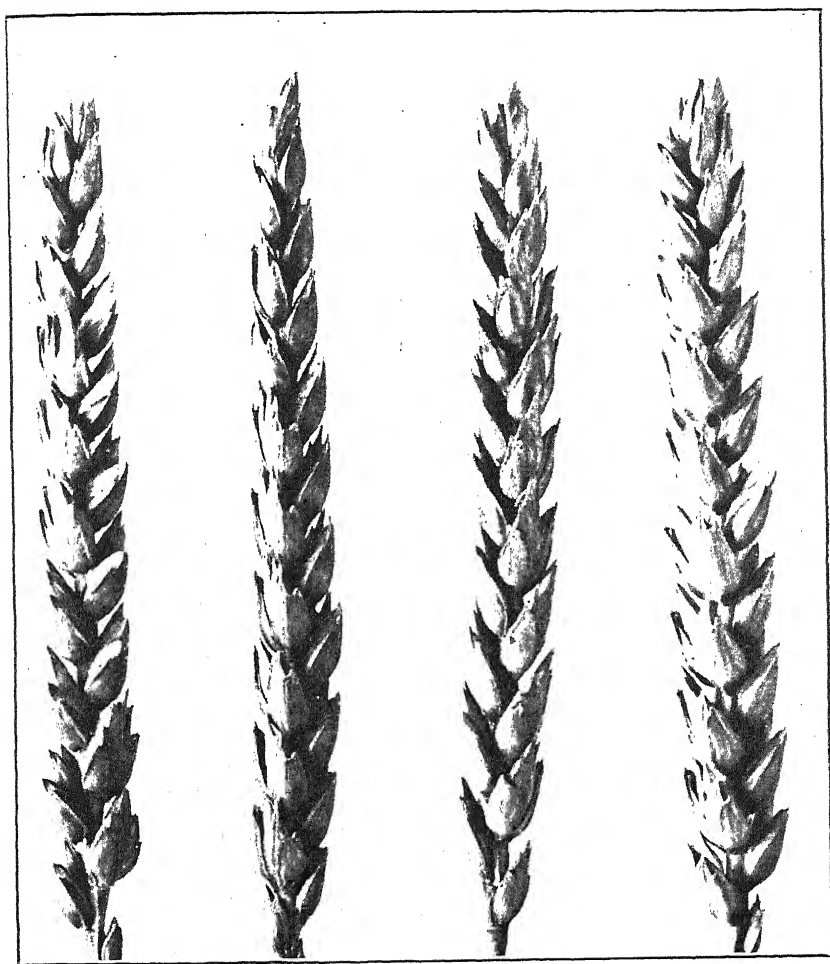


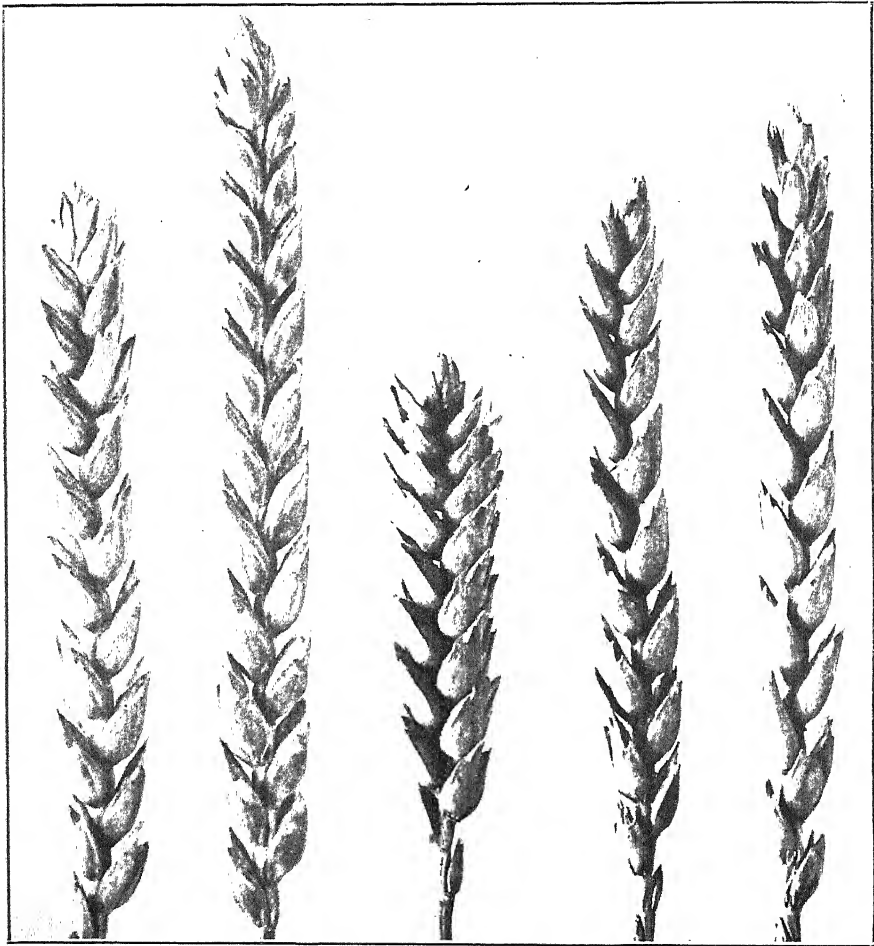
PLATE 10.—1. SOUTTER'S EARLY.
2. WARREN.

3. BXF S6A.
4. CROSSBRED 343-13.

BX1P 12.—A selection obtained from crossing Bunyip and Indian Pearl. A free stooling variety suitable for early sowing, vigorous in growth and carrying a moderate amount of flag, straw tough, but

inclined to fineness. Heads short, compact, and carrying club tips which are semi-bearded. Chaff white, grain small but plump, having the characteristic hardness of the Indian Pearl variety.

Piastre.—An early maturing variety suitable for medium and late sowing which has done well in the Downs and Maranca districts. Is a



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PLATE 11.—5. BND 66.

6. BNF 37.

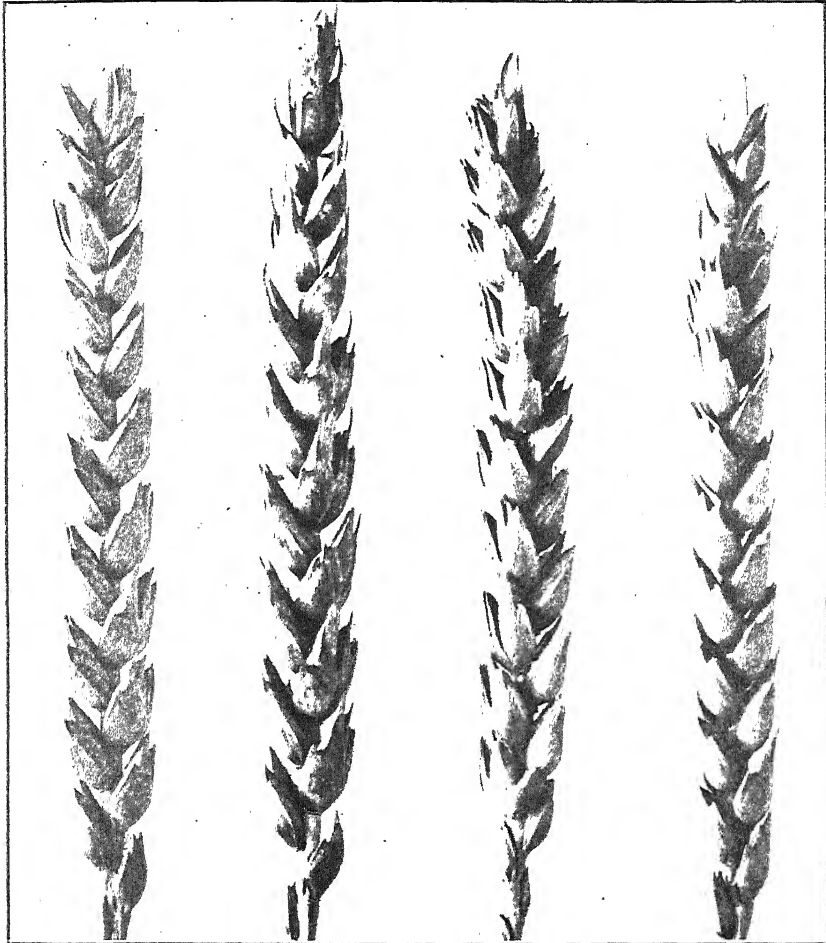
7. BXIP 12.

8. PIASTRE.

9. LOTTO.

fairly free-stooling variety having a fine, moderately tough straw. Carrying a small amount of flag. Heads medium length, fairly compact, non-bearded, chaff white. Grain small, plump, and smooth-skinned with shallow crease. Semi-translucent.

Lotto.—A variety which has been introduced from Western Australia. A heavy stooling wheat suitable for medium early and main crop sowings, of average height, carrying a moderate amount of flag. Heads long and compact, non-bearded; chaff smooth and of a pale golden colour. Grain medium sized, plump, and semi-translucent.



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11.

12.

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PLATE 12.—10. BUNGE.

11. FLORENCE.

12. AMBY.

13. CORONATION.

Bunge 1.—A variety suitable for main and medium late sowings that is well and favourably known throughout the wheatgrowing areas of Queensland. An excellent hay and grain wheat, rather a sparse stooler, carries little flag. Straw white and of medium fineness. Highly rust resistant. Heads of medium length, compact, and non-bearded and

inclined to set closely at tip; chaff smooth and white. Grain somewhat long, hard, and translucent. One of the most consistent yielders at

Ambly.—A variety suitable for main crop sowing which originated in the Maranoa district. This selected wheat proved to be the best of a number of crossbred wheats tested several years ago at Ambly on heavy black soil. It is a hardy mid-season variety and a good stooler, carrying a moderate amount of flag. Ears compact, non-bearded, chaff white and smooth. Grain plump and rather shotty in appearance, semi-translucent. Is an excellent milling wheat and has given good result in the Maranoa district.

Coronation.—A mid-season variety suitable for main or medium-late sowing on light country. Grown on heavy soils, it is somewhat inclined to produce flag, and the straw consequently becomes weaker. Is fairly rust resistant and withstands dry weather very well. Is suited to the South-Western District and drier portions of the Darling Downs. Heads of medium length, compact, and tip bearded, chaff smooth and white. Grain small, hard, plump and semi-translucent.

FARMERS AND TAXATION.

Amongst the earliest needs of farmers in any country of the world may be reckoned roads. Roads and bridges and culverts are essentials which cost money, and the money, whether found by the Government or by shire councils, must be raised by some form of taxation, such as rates, for instance. But as it has been the time-honoured privilege of farmers to grumble at the weather, so is it also their privilege to travel on well-made roads, cut them up with narrow-tired wheels, excavate huge ruts with timber wagons, and then to exclaim against the rates by means of which such damages are repaired and the roads kept in good order for their use and benefit. Taxation certainly sits not too lightly on the Queensland farmers since the war began. How would they feel if subjected to the heavy drains to which farmers in Europe are subjected, as described in the following from the "*Oklahoma Farmer*"?:—

"When the American farmer is inclined to feel 'gravely' over the conditions of his life, he will find some consolation in the thought that farmers in other countries are worse off than he is. In England, for instance, farmers are compelled to take out more licenses to conduct their business than any other class of business men. Some idea of the enormous tax on English farming can be had from the following letter written by an English farmer to his brother in Michigan. He says:— 'First of all, in January, I had to write to the Excise Officer for a form of exemption to keep my old sheep dog. The form came back in about a fortnight. Then I had to fill it up and return it before I got the license to keep it free of duty. Then I had to visit the post office to get another license, which cost me 7s. 6d.; it is to keep a spaniel, so that I could hunt the rabbits from the hedgerows. Then I had to pay 10s. for a gun license in order to shoot the rabbits, and I had to go to another magistrate's clerk to have another license approved. This was for an assistant to keep the rabbits down on my farm, which adjoins woodlands. As occasionally I drive the missus to market and sometimes ask a friend to ride, I have again to go to the post office to get a 15s. trap license. A couple of months ago I injured my leg and could not climb up into my trap, so I purchased a light-weight four-wheel. A letter from the local officer of Excise pointed out to me the fact that a license of a guinea had to be taken out. Cider running short, I had to provide something for my farm hands to drink, so I thought that I would

obtain a couple of sacks of barley malt—the barley being grown in England—and brew a few gallons of ale. To do this I had to take out another license. I have a traction engine, with which I do my farm work, such as threshing, &c., and between whiles a bit of hauling. This necessitates my taking out the most expensive license of all, a ten-pounder. On the farm there are usually a few partridges and a stray pheasant or two, reared and fed at my expense. To shoot these I have to obtain a game license, which costs me £3. Now, I sell a few gallons of milk, and to do this I have to get my premises registered by the local medical officer of health. This is practically another license. Flowing right through my farm is a splendid trout stream, yet before I can attempt to entice one of the spotted beauties from beneath its surface I have to take out another license. If I send my sow to a neighbour, I have to go to the policeman for a license for her, which he issues on condition that she does not remain away more than four days. You may smile, but it's an official fact. If I sell my neighbour a few pigs, I have to obtain a license to remove them. If I send a lot of fat baconers to town to be killed, another visit to the policeman is necessary. If I decide to have them killed at home, I must have my farm building licensed as a slaughter-house. If I have only to turn my pig across the road to clover, again I have to visit that policeman. As all these licenses have been necessary for my business, and not one of them is for luxury, such as male servants or armorial bearings, I really think that the farmer can justly claim that his business is the most licensed in the kingdom.' "

MARKET GARDENING.

A GOOD TOMATO FOR HOME GARDENS.

Br W. S. CAMPBELL, Sydney.

Of the vast number of tomatoes I have tried from time to time, I find the variety "Carter's Sunrise" to be the best of all. It is extremely prolific, free from "black spot," of a fair size, excellent flavour, smooth, of bright, rich red colour, and is well worth the attention of all those who grow some, if not all, of their own vegetables. The fruit is somewhat small for market purposes, where large fruit, no matter of what quality, is in demand.

Some years ago I noticed in an English gardening periodical that the Royal Horticultural Society of England reported that in trials made with tomatoes at the Society's gardens, Carter's Sunrise was proved to be the best tomato raised for growing under glass or in the open garden. I obtained seeds from England, and found it to be so excellent that I have grown this variety only ever since, keeping it up to the mark by careful selection of seed.

Notwithstanding the present abnormal season, with a superabundance of rain, this tomato has not suffered in the least from "black spot" or other fungus diseases; and the fruit has been abundant and good. The number of fruit on a bunch generally ranges from seven to nine and more, all of a nice fair size for home use.

During the present season one plant produced a bunch of nineteen fruits, all of a good size, and this same plant has produced a further number of fruits during the past three months. It was planted late.

The best method of growing tomatoes is to train the plants to one stem, planting them 18 in. apart in rows about 3 ft. apart, or in a single row.

I find that rooted cuttings, kept through the winter, produce the earliest fruits. Last season I had a superabundance of excellent specimens of "Sunrise" for family use at a time when half-ripe specimens were sold in shops at 2d. each.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
F. C. G. Gratton ..	"Towleston," Kingsthorpe	2	14	Holstein Cattle Club Herd Book
T. Mullen	"Norwood," Chelmer	3	20	Queensland Jersey Herd Book
J. H. Paten	Yandina	6	21	Ayrshire Herd Book of Queensland
Queensland Agricultural College	Gatton	4	38	Ayrshire Herd Book of Queensland
		..	2	Ayrshire Herd Book of Scotland
		2	9	Holstein-Friesian Herd Book of Australia
		2	31	Jersey Herd Book of Queensland
J. W. Paten	Wanora, Ipswich ..	10	42	Ayrshire Herd Book of Queensland
M. W. Doyle	Moggill	4	12	Queensland Jersey Herd Book
G. A. Buss	Bundaberg	1	15	Herd Book of the Jersey Cattle Society of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Milking Shorthorn Herd Book of Queensland
M. F. and R. C. Ramsay	Talgai, Clifton ..	5	27	Herd Book of the Jersey Cattle Society of Queensland
George Newman ..	Wyreema	12	47	Holstein-Friesian Herd Book of Australia
R. Conochie	Brooklands, Tingoor	9	21	Queensland Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
W. J. Barnes	Cedar Grove	10	37	Queensland Jersey Herd Book
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
W. J. Affleck	Grasmere, N. Pine ..	6	31	Queensland Jersey Herd Book
A. J. McConnel	Dugandan, Boonah	19	36	Australian Hereford Herd Book
A. Pickels	Blackland's Stud Farm, Wondai	4	62	Illawarra Dairy Cattle Herd Book of Queensland
G. C. Clark	East Talgai, Ellinthorp	3	7	New Zealand Herd Book
H. D. B. Cox	Sydney (entered brother's name)	3	16	Commonwealth Standard Jersey Herd Book
J. T. Perrett and Son	Coolabunia	2	36	Illawarra Herd Book of Queensland
State Farm	Kairi	4	8	Ayrshire Herd Book of Queensland
		1	2	Holstein-Friesian Herd Book of Australia
		45	127	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	2	22	Illawarra Herd Book of Queensland
W. T. Savage	Ramsay	50	400	Australian Hereford Herd Book
Tindal and Son	Gunyan, Inglewood	3	28	Queensland Jersey Herd Book
J. N. Waugh and Son	Prairie Lawn, Nobby	9	55	Ayrshire Herd Book of Queensland
J. H. Fairfax	Marinya, Cambooya (2)	25	100	Queensland Shorthorn Herd Book
C. E. McDougall	Lyndhurst Stud, Warwick (2)	6	20	Ayrshire Herd Book of Queensland
J. Holmes	"Longlands," Pittsworth	1	20	Illawarra Dairy Cattle Association
P. Biddles	Home Park, Netherby	1	9	Milking Shorthorn Herd Book
A. Rodgers	Torran's Vale, Lane-field	1	..	Holstein-Friesian Herd Book of Queensland
R. S. Alexander	Glenomond Farm, Coolumboola	2	..	Holstein-Friesian Herd Book of Australia
State Farm	Warren	3	83	Ayrshire Herd Book of Queensland
S. H. Hosking	Toogooloowah	2	15	Holstein Cattle Club Herd Book
W. J. H. Austin	Hadleigh Jersey Herd, Boonah	2	11	Queensland Jersey Herd Book
Ditto	ditto .. ..	..	6	Commonwealth Standard Herd Book
H. M. Hart	Glen Heath Stud, Yalangur	7	21	Ayrshire Herd Book of Queensland
C. Behrendorff	Inavale Stud Farm, Boonah	3	9	Holstein-Friesian Herd Book of Queensland
F. A. Stimpson	Ayrshire Stud Farm, Fairfield, South Brisbane	25	77	Ayrshire Herd Book of Queensland
M. L. Cochrane	Paringa Farm, near Cairns	5	21	Ayrshire Herd Book of Australia

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
Albert Cook	"Greenmount," Mackay	1	8	A.-A. Stud Book, New Zealand
Thomas Brown	"Bellgrove," Kingaroy	1	14	Do.
Higgins Bros.	Sandy Creek, Leslie, Q.	6	2	Do.
Calcino Bros.	"Summariva," Charleville	3	4	Do.
W. M. McKelvie	"Undulla," Miles ..	5	4	Do.
James Connors	"Glen Erin," Nanango	1	2	Do.
J. A. Mackintosh ..	"Yundah," Warwick	2	8	Do.
M. J. Luff	Kaimkillenbun ..	1	1	Do.
A. Spencer	Brisbane	2	1	Do.
Beak Pastoral Co. ..	Rockhampton ..	2	10	Do.
W. Jackson	Central Farm, Savannah, Mackay	1	1	Do.
E. Swayne, M.L.A. ..	West Plane Creek ..	1	2	Holstein-Friesian Herd Book of Queensland
Godfrey Morgan	"Arubial," Condamine	3	6	Queensland Shorthorn Herd Book
John Anderson	"Fairview," Southbrook	7	34	Ayrshire Herd Book of Queensland

THE BLOW-FLY PEST.

ANOTHER FLY-TRAP.

Mr. H. A. Adams, Yalleroi, sends us the following suggestion for the construction of a fly trap:—

As the blowfly pest is one that many have to deal with, myself included, and many are the devices to cope with them that have been invented, and many are the claims of their respective merits (the "Destructo" fly-trap and many others which are costly), and I do not think they are worth the trouble, from the results obtained, I give you this, if you think it is worth the print. I have tried it, and I believe it outclasses all the other traps I have seen.

Get a kerosene tin, cut it on the two ends and one side, leaving the one side uncut; the cut must be made to allow the right-hand half to be as high as possible above the left-hand half. Having cut the two ends and one side, turn over to the right hand the higher half of the tin, and the uncut side will keep the two firmly together. Put a piece of fine soft wire around the two to keep them from tipping; punch four holes in it, one in each corner, to hang with wire to trees or fence; in the lower half of the tin, put your bait—the best of all, the inside or entrails of a sheep, but they must be green or highly decomposed before using. In the higher half of the tin put your arsenical solution; add to that some sugar; paint the bait with this solution and allow some to remain in the bottom of the bent half, as the fly will go for the moisture in the bottom, it being sweetened. Fill the top half of the tin with arsenical solution, get two strips of flannel, about 2 in. wide and long enough to go to the bottom of the liquid and rest on the bait in the lower tray or half of the tin; the flannel will syphon the liquid from the higher tray to the lower on to the meat, until the whole of the liquid is exhausted, keeping the bait well poisoned. You will have every fly in the vicinity by this simple method.

But do not use any meat or bait unless it is first thoroughly decomposed, as the arsenical solution will to a great extent prevent it from decomposing.

SHEEP MAGGOT FLY PEST.

By L. G. JONES.

A CRITICAL ESTIMATE OF THE FLOCKMASTERS' PRACTICE IN COMBATING THIS PEST.

After carefully reviewing this subject, I have come to the conclusion that pastoralists are not acting in a right manner when they continue the old-fashioned plan of dagging the sheep. But instead, the dags should be left on the sheep and poisoned by submerging in a very strong arsenical solution.

FORMULAE.

Arsenic, 1 lb.; washing soda, $\frac{1}{2}$ lb. To be prepared in the following manner:—Take rain water 4 gallons, and add to it $\frac{1}{2}$ lb. washing soda. Heat to near the boil (205-206 Fah.). At this point add 1 lb. of arsenic (commercial) and bring as quickly as possible to the boil, and continue to boil for about fifteen minutes (after putting in the arsenic do not stir longer than is necessary to distribute the arsenic). Now, N.B., just as you lift from or draw the fire, have ready 4 pints of cold water and drop it into the mixture and stir well for about five minutes. Experience has shown me that after arsenic has been boiled in water it goes more completely into solution when suddenly put off the boil; hence the reason for stressing these directions. If "hard" or creek water is used, proceed as directed for rain water, except use 4 oz. of washing soda instead of 8 oz. If water is "hard," too much washing soda will further harden it.

Then when the fly strikes or lays her eggs in the dags, the dags will be in such a condition as to prevent the maggots coming to maturity. *Don't lay poison baits or poison any carcasses*, because the laying of these baits and poisoning of these carcasses are the cause of your troubles, in this direction, being intensified to-day. You have driven the fly from her natural medium, and caused her to go further a-field—to wit, the sheep. A non-poisonous offal fly-trap would be better to use than the poisonous offal trap, and so entice her away from the sheep. This would at least have the advantage of enabling you to burn any carcasses of dead stock that are lying about the paddocks instead of leaving them as an attraction for the fly, and if the offal only of healthy sheep were hung up, no harm could come of it. If this is done, hang your trap low, about 3 ft. from the ground. Blowflies always fly low to the ground. The offal fly-trap is very ingenious and clever, but it is not calculated to work for any length of time, for the reason that the maggot fly has the power of selection very strongly developed, and when she finds that she is getting no results from her industry, she will soon become "fly-trap shy." So, likewise, will she treat the poisoned dags, and so transfer her energies elsewhere, to the relief of the sheep and appreciation of the owner. To follow this article to a proper conclusion, it is necessary that the sheep should have an arsenical salt lick, for which I cannot do better than refer the reader to my article that appeared in the February issue of the *Queensland Agricultural Journal*, which, in my opinion, would lend itself well to this treatment of the fly pest. The doses for a sheep given there would not, in my opinion, be all absorbed into the system of the animal partaking of it. Nor is it necessary that it should be; therefore, they would pass out with the droppings, and the droppings would be in such a condition as to greatly retard the development of the maggots. The maggots thrive or mature only in a suitable medium, otherwise they cease to become active, and the possibilities of the pest would be greatly paralysed. And thus we bring about the altered condition of the medium that brings about the activity of the blowfly.

In further dealing with this pest, an excellent plan is to keep a watchful eye on the sheep's bedding hills, and examine the dung (early morning is the most appropriate time), when the experienced eye will quickly notice if there is anything abnormal about it. If you find liquid manure, immediately muster or gather your sheep and treat them accordingly. When approaching the sheep's camping ground, always remember to do so from a westerly direction, because the sheep invariably move off towards the morning sun, and by so advancing you will not disturb your sheep. Practice these suggestions, and you will not regret it.

If the fly strikes a sheep on any part of the body other than the tail, it is because of the yelk being diseased, that sticky kind that appears in the wool fibre, and has a tendency to stunt the growth, discolour the wool, and always has a damp and sticky feel, and often a bad smell. When this is present the sheep are not in good health; they require medicine. Iron is a very appropriate medicine for sheep, and for its proper form and vehicle, I refer you again to the February issue of the *Queensland Agricultural Journal*, and under the heading of "A Natural Remedy for Worms and Blood Diseases in Sheep," it will be found.

Summed up, it all means: Poison dags *only*, and so make the pest sheep-shy.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 27TH JANUARY TO 26TH FEBRUARY, 1918.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Belinda ...	Ayrshire ...	14 Jan., 1918	988	4.3	49.15	
Mistress Bee ...	Jersey ...	23 Jan., "	844	4.8	47.42	
Lady Margaret ...	Ayrshire ...	27 Dec., 1917	903	3.9	41.13	
Violette's Peer's Girl ...	Jersey ...	26 Oct. "	540	6.3	39.90	
Auntie's Lass ...	Ayrshire ...	5 July "	656	4.8	37.90	
Leading Lady ...	Jersey ...	26 Dec. "	722	4.4	37.10	
Lady Loch II. ...	Ayrshire ...	3 June "	493	6.3	35.92	
Jeannie ...	"	13 Dec. "	785	3.9	35.82	
Iron Plate ...	Jersey ...	14 Oct. "	731	4.2	35.52	
Burlesque ...	"	6 Oct. "	481	6.0	33.67	
Leonie ...	Ayrshire ...	4 Sept. "	510	5.7	33.67	
Miss Edition ...	Jersey ...	12 Nov. "	715	3.6	33.45	
Comedienne ...	"	13 Dec. "	505	5.7	33.33	
Skylark ...	Ayrshire ...	24 May "	488	5.9	33.05	
Thornton Fairetta ...	Jersey ...	30 June "	427	6.6	33.04	
Songstress ...	Ayrshire ...	1 Oct. "	529	5.2	32.15	
Lilia ...	"	11 July "	554	5.0	32.13	
Miss Bell ...	Jersey ...	27 June "	528	5.1	31.68	
Lady Dorset ...	Ayrshire ...	14 Aug. "	629	4.3	31.45	
Glow VI. ...	Guernsey ...	9 Nov. "	791	3.4	30.53	
College Bluebell ...	Jersey ...	28 June "	581	4.3	30.10	
Miss Edith ...	"	23 Dec. "	702	3.7	30.08	
College Cold Iron ...	"	7 Dec. "	516	5.0	29.94	
College Ma Petite ...	"	10 Nov. "	543	4.6	29.53	
Hedge's Nattie ...	Holstein ...	1 Feb., 1918	586	4.4	29.41	
College Damsel ...	"	12 July, 1917	702	3.6	29.08	
Miss Security ...	Ayrshire ...	27 Mar. "	436	5.4	28.99	
Nina ...	Shorthorn ...	6 Sept. "	684	3.6	28.76	
Princess Kate ...	Ayrshire ...	28 June "	362	6.7	27.85	
La Hurette Hope ...	Jersey ...	22 Aug. "	482	5.0	27.81	
Hedge's Dutchmaid ...	Holstein ...	4 Sept. "	639	3.8	27.70	
Netherhall Queen ...	Ayrshire ...	30 June "	551	4.3	27.55	
Kate						
Sweet Meadows ...	Jersey ...	8 Aug. "	468	4.9	26.86	
College St. Margaret ...	"	9 Nov. "	552	4.2	26.49	
College Mermaid ...	"	21 Aug. "	459	5.0	26.43	
Lady Annette ...	Ayrshire ...	19 Oct. "	607	3.6	26.30	
Miss Betty ...	Jersey ...	27 Mar. "	439	5.0	25.23	
Buttercup ...	Shorthorn ...	2 June "	454	4.7	25.15	
Rosine ...	Ayrshire ...	21 June "	522	4.2	24.97	
Glade ...	Shorthorn ...	29 Mar. "	363	5.7	24.20	
Netherton Belle ...	Ayrshire ...	17 July "	627	3.4	23.98	
Lerida II. ...	"	2 June "	389	5.3	23.56	
Snowflake ...	Shorthorn ...	17 May "	391	4.0	22.25	
Hedge's Madge ...	Holstein ...	22 Mar. "	415	3.7	21.51	
Confidence ...	Ayrshire ...	25 June "	427	4.4	21.36	
Prim ...	Holstein ...	23 Aug. "	605	3.1	21.18	
Lady Mitchell ...	"	26 Sept. "	505	3.5	20.20	

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, FEBRUARY, 1918.

Much better weather has prevailed throughout the month, but it came rather late to cause any noticeable improvement in egg-production after the severe weather we had experienced during the preceding months. A large number of birds are in moult, but it is pleasing to note that many of them are laying and moulting at the same time. Stamina in the stock competing is very easily detected at the present time, and closely-bred birds are showing signs of their weakness. Messrs. C. C. Dennis and J. Zahl each lost a bird during the month. The following are the individual records:—

Competitors.	Breed.	Feb.	Total.
LIGHT BREEDS.			
E. Chester	White Leghorns	130	1,514
G. Chester	Do.	103	1,308
Oaklands Poultry Farm ...	Do.	94	1,270
*G. H. Turner	Do.	98	1,267
W. R. Crust	Do.	92	1,264
W. Becker	Do.	102	1,259
*J. M. Manson	Do.	95	1,244
F. W. Leney	Do.	73	1,237
Kelvin Poultry Farm ...	Do.	89	1,217
T. Taylor	Do.	97	1,208
D. Fulton	Do.	107	1,198
*A. T. Coomber	Do.	89	1,179
*J. R. Wilson	Do.	76	1,165
T. A. Pettigrove, Victoria	Do.	75	1,164
Chris. Porter	Do.	73	1,149
*J. Zahl	Do.	80	1,143
Moritz Bros., S.A.	Do.	71	1,132
J. G. Richter	Do.	87	1,128
Quinn's Post Poultry Farm	Do.	69	1,111
T. B. Hawkins	Do.	90	1,103
*Mrs. J. R. D. Munro ...	Do.	76	1,001
Mrs. W. D. Bradburne, N.S.W.	Do.	112	1,088
J. L. Newton	Do.	83	1,088
C. Knoblauch	Do.	102	1,087
A. Shillig	Do.	72	1,076
*Dixie Egg Plant	Do.	66	1,071
A. H. Padman, S.A.	Do.	64	1,070
Mrs. S. J. Sear	Do.	101	1,068
J. Holmes	Do.	77	1,065
C. H. Singer	Do.	109	1,050
*A. W. Bailey	Do.	68	1,046
Mars Poultry Farm	Do.	65	1,044
L. G. Innes	Do.	81	1,043
G. J. White	Do.	79	1,037
E. Cross	Do.	64	1,030
F. Clayton, N.S.W.	Do.	53	1,022
S. C. Chapman	Brown Leghorns...	85	1,020
C. P. Buchanan	White Leghorns...	89	1,019
*T. Fanning	Do.	38	999
E. A. Smith	Do.	80	996
Miss Hinze	Do.	80	987
J. Ferguson	Do.	72	985

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Jan.	Total.
LIGHT BREEDS— <i>continued.</i>			
Geo. Williams	White Leghorns ...	74	982
R. Holmes	Do.	65	977
G. Howard	Do.	65	968
*A. E. Walters	Do.	45	956
Mrs. J. Carruthers	Do.	70	955
*Dr. E. C. Jennings	Do.	76	935
*C. C. Dennis	Do.	0	822
HEAVY BREEDS.			
*R. Burns	Black Orpingtons ...	78	1,350
*Mars Poultry Farm	Do.	112	1,303
W. Smith	Do.	90	1,204
A. E. Walters	Do.	86	1,187
*E. F. Dennis	Do.	78	1,143
W. S. Hanson, N.S.W.	Do.	72	1,118
P. C. McDonnell, N.S.W.	Do.	81	1,115
F. A. Claussen	Rhode Island Reds ...	8	1,100
Mrs. J. H. Jobling, N.S.W.	Black Orpingtons ...	78	1,071
*E. A. Smith	Do.	92	1,071
D. Kenway, N.S.W.	Do.	89	1,040
H. Jobling, N.S.W.	Do.	68	1,034
Cowan Bros., N.S.W.	Do.	62	999
C. B. Bertelsmeier, S.A.	Do.	80	983
King and Watson, N.S.W.	Do.	71	982
*Oakland Poultry Farm	Do.	63	959
*Miss Hinze	Do.	50	957
R. Burns	S. L. Wyandottes ...	87	938
J. M. Manson	Black Orpingtons ...	69	931
E. Morris	Do.	39	890
C. C. Dennis	White Wyandottes ...	83	887
*Kelvin Poultry Farm	Plymouth Rocks ...	78	886
*F. W. Leney	Rhode Island Reds ...	45	748
F. F. Clayton	Do.	45	727
Totals ... ..	...	5,657	78,380

* Indicates that the pen is engaged in the single hen test.

RESULTS FROM SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
G. H. Turner	170	192	234	242	201	228	1,267
J. M. Manson	206	220	177	175	219	247	1,244
A. T. Coomber	188	140	232	217	205	197	1,179
J. R. Wilson	208	184	179	203	187	203	1,165
J. Zahl	223	110	234	127	233	216	1,143
Mrs. Munro	244	189	143	153	146	226	1,101
Dixie Egg Plant	175	194	178	219	105	200	1,071
A. W. Bailey	33	193	218	209	210	182	1,046
T. Fanning	137	192	181	146	146	197	999
A. E. Walters	120	130	181	201	170	174	956
Dr. Jennings	127	115	187	167	205	134	935
C. C. Dennis	176	89	77	164	162	184	853

EGG-LAYING COMPETITION—continued.
RESULTS FROM SINGLE HEN PENS—continued.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
HEAVY BREEDS.							
R. Burns	187	182	245	174	251	311	1,350
Mars Poultry Farm	201	235	212	216	227	217	1,308
E. F. Dennis	228	213	194	254	218	36	1,143
E. A. Smith	181	183	147	194	190	176	1,071
Miss Hinze	161	136	130	171	182	177	957
Oaklands Poultry Farm... ..	213	136	140	124	214	132	959
Kelvin Poultry Farm	137	139	148	191	106	165	886
F. W. Leney	125	147	114	115	114	133	748

A REMARKABLE FOWL FATALITY AND A POISONOUS PLANT.

On the 19th February, 1918, Mr. H. J. Hockings, of Woolloongabba, mentioned the recent occurrence of a remarkable fatality in his fowlyard. During the previous few days, and at the date mentioned, the thirty-seven fowls he had possessed had sickened in a strange manner indeed, and no less than thirty-four of them had died.

The first symptom—as he stated—exhibited by these birds that at the time were well-developed and healthy, was their sudden trembling “like an aspen-leaf,” this quivering in their feathers growing in intensity and speedily so. The strongest and most vigorous of them—a greedily-feeding bird—after this phenomenon had occurred for only half a minute, dropped. Some remained trembling for a minute or more and then fell; seventeen thus collapsing at the expiration of three to four minutes. When once they went down they were perfectly helpless, and not only could not stand, but might even roll over on to their sides; whilst at the same time their heads drooped. In fact (as described) they “looked like wet rags.” In the case of two birds, they were affected whilst still on the perch; and (as happens with birds when in a condition of rest) their toes kept clinched and so they remained stationary thereon. But their heads and necks, however, meanwhile hung down; although these, when touched, curved slightly and slowly upwards, after the manner of those of an injured snake when its death is coming on. Usually, they lay perfectly still upon the ground where they had collapsed, for three or four days. When touched (kicked) during this time, however, they might utter a low squeaking sound—momentarily; and, at the same time, successive waves of motion, raising up the feathers as they proceeded, would creep over their bodies. They would usually at length thus die, within three or four days, although one had even succumbed in as short a time as three minutes after it had been noticed that it was already sick. Of the two that were fixed on their perches, one had remained in this position for five days, and the other four. They then fell off, and gradually, under treatment—the internal administration of castor oil—

developed the faculty of walking. One of these, when but a day had elapsed since it had thus left its perch, was still quite blind; but during the next day it could partly see, picking up grain and small stones indiscriminately. This convalescent bird, however, still remained timid, and thus on being disturbed quickly scuttled away. Its eyes meanwhile were still half-shut and its face red and congested.

No food was found in the crops of dead birds, but their gizzards were more or less full. Their livers were noticed to be pale, blotched, and spotted, and their hearts and parts adjacent to their hearts much congested.

On inquiry, it was elicited that two strange plants had recently grown spontaneously (seeds without being broken up conveyed by birds) on the land where the fowls had been running—one a creeper with red berries and the other a herb. Moreover, the poultry had been noticed to partake of the fruit (seeds) of both.

Our informant meanwhile submitted samples of the plants referred to, and an examination of them prompted the following memorandum, in which the occurrence under notice is attributed definitely to a special agent:—

“Relative to the fatal sickness that so many of your fowls have recently experienced, and to my suggestion that the symptoms and the history of this occurrence as detailed by you, both indicated the action of a specific poison. I may further add that of the two ‘strange plants’ whose fruit you have noted as having been recently eaten by the fowls in which this fatality and sickness occurred, and that you have submitted, one is named *Rivina* (*Lævissima*)—Fam. *Phytolacaceæ*—and the other *Solanum jasminoides*—Fam. *Solanaceæ*; the latter being the blue-flowered creeper and the former the herbaceous weed.

“With regard to the possible effect on fowls of feeding on the fruit (seeds) of these, I may state as follows:—

“1. *Rivina*.—Notwithstanding that this plant is a member of a plant family whose roots, leaves, and berries are said to contain ‘acid, vesicant, and drastic substances,’ these have for their principal effect, severe purging; but I am not aware, however, of any such property having been discovered as being possessed by any genus of the *Phytolacaceæ* other than the species of *Phytolacca* itself. Indeed, on the other hand, we are informed by the late Colonial Botanist, Mr. F. M. Bailey, without, however, reference to authority for the statement, that in America the fruit of *R. Lævissima* is actually used as food for birds.

“2. *Solanum jasminoides*.—The berries of this plant were formerly pointed out to me by a Queensland resident as having proved poisonous to fowls; and on examining the seeds of these now placed by you at my disposal, I find, on applying a special test (known as Mandelin’s), that the sections show the microchemical reaction for the presence of the toxic principle—*Solanine*.

“And, I may add, the action of this alkaloid, both on warm and cold-blooded animals, has been described as follows:—‘*Solanine* paralyses

the central nervous system without affecting the peripheral and voluntary muscles, slows heart and respiration, lessens sensibility, and causes death with convulsions.' (T. Lauder Brunton in 'Pharmacology'.)

"On consideration of the symptoms manifested by your sick fowls, and in view of the fact that they had previously partaken of the Solanine—containing fruit of the *Solanum* named—I have but little hesitation in concluding, therefore, that the fatality remarked, and the latter event, stand in the relation of cause and effect.

"This conclusion suggests a line of action to be followed that it is not for me to describe.

"(Signed) HENRY TRYON,

"Vegetable Pathologist, &c.

"21st February, 1918."

Addendum.—Subsequent to the receipt of foregoing memorandum Mr. Hockings stated that he had re-examined the gizzard contents of certain of the dead fowls, and that these comprised millions of seeds that he had first taken for grass seeds (*Paspalum dilatatum*), but that he afterwards found, on comparison being made, were actually those of the red-berried creeper (*Solanum seaforthii*). Portions of the flesh of its fruit were also discernible amongst them.

THE POULTRY INDUSTRY.

By J. C. BEARD, Poultry Instructor.

HELPFUL HINTS FOR BEGINNERS.

In selecting ground for the keeping of poultry avoid, if possible, heavy clay or black soils. Light sandy soil or loam is far preferable, making less work with better results.

Choose sheltered ground for poultry-keeping, not exposed to the bleak westerly winds, a mistake so often made at the commencement. All shelters should be placed so as to have a north or north-easterly aspect, and the back and two ends should be boarded close with wire in front.

In taking over a site for poultry-keeping, always see that there is an ample water supply. If outbuildings are already erected, this saves so much capital, as these can be utilised for foodsheds, incubation, and storerooms.

Orchard land is always preferable. The fruit adds to one's income, and the trees do better with poultry running beneath them.

Arrange the floor of the house, even if made up inside with soil, higher than the outside ground, to ensure the same keeping dry. Make all perches movable, and these should be all on one level, not, as in the old style, ladder fashion, and avoid using saplings; sawn timber 3 in. by 1½ in., with top edge a little raised (?). These should be placed on uprights, 2 ft. high, driven into the ground. Cut the head off a 3 in. nail, and drive it in on top of the upright to act as a peg. Bore a small hole through the perch and drop it onto the pegs. These keep the perch in its place, and it is easy to remove the latter when necessary. Keep each end of the perch 1 ft. from the wall.

If fowls will insist on flying out of their pens, cut off short most of the inner flight-feathers on one wing only, leaving the outer flight-feathers intact, otherwise the fowl looks unsightly.

If felt is used on the roofs, this should be tarred once a year, throwing on dust or sand before the tar dries. Creosote is far and away the best preservative for both inside and outside of the houses. No insects can live where this is used, and it acts as a good disinfectant.

Never overcrowd chicken coops, foster-mothers, or fowl-houses, as disease in some form is bound to follow.

When feeding fowls in the morning, care should be taken to give all a portion; those that hang behind and do not readily eat, or remain on the perch, are probably sickening. A careful watch should therefore be kept on them, or disaster may follow.

Rather underfed birds required for laying and breeding than otherwise. Always remember that overfeeding injures the birds' health, clogs up their system, and prevents all possibility of their producing eggs, as well as unnecessarily robbing your pocket.

Test all eggs, whether under hens or in incubators, on the sixth day, as this saves time in trying to hatch from useless and infertile eggs.

A male bird can always run with a large number of hens when an unlimited run is provided. But when penning is necessary, for heavy breeds from six to eight and of light breeds eight to ten hens are quite sufficient to breed from with good results, provided there is perch room.

Always place the rearers and chicken-coops in a sheltered position (on short grass), moving the coops every day.

See that chicken-coops and houses are free from draughts and are rainproof, otherwise colds, roup, or other diseases will soon make themselves evident.

Never allow chickens of different ages to run together; the largest are sure to rob the younger ones of their food, and the latter then weaken, droop their wings, and die.

In many cases large clusters of white nits will be found at the root of the feathers around the vent; these should be pulled out, burnt, and carbolic oil applied to the parts.

If a hen or pullet will persist in going into the nest-box, not wanting to lay, nor being broody, it is a sure sign she is ailing.

A fowl moping away from others in a secluded corner should be caught and examined for the cause.

Cleanliness is the keynote to success in the management of poultry.

REPLENISHING THE STOCK.

Few breeders realise the need for renewing the stock from year to year, and they wonder why the chickens do not come out strong and healthy. It is impossible to go on from one year to another without a change of blood, as something injurious is sure to result. The subject of breeding and reproducing species is the most complex question which any breeder has to face; but if it is tackled in the right way there need be no fear, either from loss of quality or stamina.

Nearly every breeder has his own method of getting at results, and many of the old hands get there, while some of the novices fail, and then blame the industry. Now it is usual to use pullets for the earliest breeding pens, not because they are most suitable, but because they come on to lay earlier and produce more eggs than the old birds. But if you want thoroughly reliable chickens, with the strongest stamina, they must be bred from hens in the second season. Many people will not buy these birds, and yet, if they want to breed the best chickens, they must use these, with a vigorous cockerel. To use youngsters on both sides may be one way of getting chickens, but it is better to hatch fifty chickens and rear the lot than to hatch a hundred and only raise fifty.

The best exhibition stock will be reared from hens one year or two years old, even if a cockerel is used; the right thing is to use a male which is full of vigour and fully developed. To breed from immature stock is but to court failure from the start, and have a lot of trouble in the raising. The eggs from the second-year birds will do better and make larger birds, and will be more suitable for breeding another year. I have known good results from cockerels and pullets when these birds have been bred from old stock, which proves that the vigour is handed down for at least the first generation.

There is often failure in using the same cockerel too long in the same pen, and though he may fertilise the eggs, the germ is not strong enough to hatch out a vigorous chick. The subject of breeding needs more care and thought than is usually given by the novice. What you need are chickens, and it is not enough to get fertile eggs, for if the germ therein is weak, the chick will probably not hatch out; and even should it do so, it will only live a short time. Now, by the keeping of the one cock in the pen all the season, this is what happens: He is worked too long and gets weaker as time goes by; hence the breeding results are far from satisfactory.

If you use one male bird for a month, it will be all the better to give him a rest; but as this means two cockerels for each pen, the small breeder cannot carry out the idea. But he must do the next best thing. Supposing he has only one cock, and that it is from him that he has to get all his chickens, then the cock must be kept in good form, and this can best be done by generous feeding. I have known of the method of driving the hens into the house and giving the cock an extra feed outside; but then he should not be kept in the pen too long. To keep setting eggs without raising chickens is so much waste of time and labour, and the object should be to only set the number required and to see that each egg produces a chick.

The ordinary farmer has a very good way of dealing with his stock if he would only keep it up and just breed when the male birds are at their best. As a rule, the hens all run loose round the farm, and roost together; hence there is no attempt at a breeding-pen, but what chickens are hatched must come from this one lot. When there is a number of hens, he buys, say, three male birds just when he is ready for breeding, and if these have run together there will not be any fighting when they are all put down with the hens, which use the one roost. By this means the whole of the eggs collected are fertilised, and any of them will be good enough to set. Probably his hatching extends over a period of two months, and then it is over. During this time all the eggs should be fertile and the chicks come out healthy and strong. After this time the male birds are killed off, and the next season a fresh lot is got in and the same procedure gone through. As these birds live under the healthiest conditions, with plenty of exercise, both adults and youngsters should do well, and at least 90 per cent. of the eggs be fertile, hatch out, and grow into good adult stock.

All breeds are not alike, and some varieties are more active than others; these, consequently, will take more hens than breeds like the Orpington or Asiatic varieties. Any of the Leghorn family will be more fertile with twelve hens than some Black Orpingtons will be with only three, although, as a rule, Buff and White Orpingtons are more vigorous, and a good cockerel will fertilise all the eggs from eight hens. Wyandottes are fairly active, and the best laying sorts are small birds, which prove fertile up to ten hens, though, if left too long together, the hens should be reduced, or the cockerels should be given a rest. The safest rule for breeding is to use present-year males with two-year hens, and then good results may reasonably be expected.

SUGAR AS A MEAT PRESERVATIVE.

There is nothing new in the idea of employing sugar instead of salt as a preservative for meat. We have in past years had frequent opportunities of noting the effects of sugar on hams. The hams were placed in a pickle, if we may so call it, of sugar and molasses. The fresh hind quarters of the pig were first well rubbed with powdered sugar, and were then placed in the saccharine solution and left undisturbed for some weeks. When cooked, the meat did not present that red and white appearance of the brine-cured article, but more resembled fresh pork. Yet the taste was precisely the same as that of ham, albeit a little sweeter. In connection with this, we learn that experiments have been made under the direction of the French Minister for Agriculture, which demonstrate that sugar is a good agent for meat preserving, and possesses some advantages over salt. It is pointed out that the latter absorbs a portion of the nutritive substances and of the flavour of the meat. When an analysis is made of a solution of salt dissolved by water contained in meat, albumenoid bodies, extractive substances, potassa, and phosphoric acid are found. Salt deprives meat of these substances so much the more readily in proportion as it enters the tissues more deeply or acts for a longer time. The result is that the meat, when taken from the saline solution, has lost nutritive elements of genuine importance. Powdered sugar, on the contrary, being less soluble, produces less liquid. It forms round the meat a solid crust, which removes very little water from it, and does not alter its taste. Thus preserved it is sufficient that the meat be immersed in water before using it. The report declares that although this treatment costs a little more than preservation by salt, account must be taken of the final result, and of the loss prevented, which offsets the difference in cost between the two preservatives.

The Orchard.

PICKLING OLIVES IN ITALY.

The great cost of picking olives in Australia would appear to bar olive-growing in Australia. But why should not the Italian method be tried? In Calabria, in Italy, where there are very extensive olive groves, the proprietors dig out a kind of huge saucer round the trees, about 1 ft. deep towards the centre, sloping up to the surface. The ripe olives, as they drop from the trees, roll down the sides of the depression, and are daily shovelled out with wooden shovels. This process might overcome the picking difficulty in Australia. In Italy the trees are also beaten, when a whole army of women and children is employed picking them up. Of course, in Italy, wages are very low. Women earn 6d. per day; boys 4d., without rations; ordinary farm labourers are paid 7d. per day; and a shepherd will work for 4s. a month and rations of rye bread and skim milk, from dawn to dark. We would like to see the cultivation of olives established in Queensland, but would rather be without Queensland-grown olives than see them grown for what can but be starvation wages.—[Ed. "Q.A.J."]

At Mildura, Victoria, a few years ago, 25 tons of olives produced 875 gallons of oil, worth at the time 7s. per gallon, and pickers received 3s. per 112 lb. The profit amounted to £8 6s. 3d. per acre. Pickers, since the war, were paid £6 to £10 per ton, but the price of olives and oil also advanced, the manufacturers paying £13 per ton for olives. The price of olive oil in the United States in July, 1917, was 6s. 8d. per gallon.

Mr. Beaumont, Manager of the Government Orchard, Blackwood, South Australia, writing on diseases of the olive, says:—

"As far as disease goes, the olive is a very hardy tree, and is not easily injured, but its greatest scourge is the olive scale, which undoubtedly spoils the beauty and usefulness of the tree, but it is easily dealt with, and I think it is to be regretted that trees, even within the parks of Adelaide, are allowed to go uncared for, and thus to spread the trouble far and wide. On the secretions from the olive scale, the "sooty fungus" which we are all so familiar with, exists. Unfortunately, this scale and the fungus frequently attack other fruits and flowering shrubs. An occasional spraying with kerosene soap wash will clean the trees effectively.

The curculio beetle is fond of the olive, but it may be checked with arsenate of lead 1 lb. to 5 gallons to 10 gallons of water."

He further gives the following figures as to production, consumption, etc., in Australia: "One ton of olives should yield 35 gallons to 45 gallons of oil. A grove of 14 acres of trees, now 30 years old, has averaged 450 cwt. of olives per acre for 20 years, the annual yield varying, of course, with the seasons. Simply let me tell you that the olives are crushed thoroughly so as to free all the oil contained, the crushed product is placed in mats of esparto grass, and subjected to pressure, say about 300 lb. The mass is then broken up, and warm water added, and is again pressed, perhaps three or four times, and up to a pressure of 1,000 lb. The oil and water are separated as soon as possible after being released, and the oil is either filtered or allowed to settle, according to the method adopted at the various factories.

"Our consumption of oil is at present about 60,000 gallons, and we produce about 14,000 gallons, so there is room for improvement, and when we allow for the further fact that we import about 300,000 gallons of cheap cotton seed and colza oil, we will find even a greater reason for extending the culture of the olive. Then there is the preparation of the ripe olive as a food, and the green olive as an appetizer. Here again is great scope for enterprise. Olive oil is a powerful food, and is a splendid substitute for animal fat, and has practically no waste. There is nothing better for the frying of foods. It is a fine preservative; we are all acquainted with its use in tinning fish, etc.

"As a medicine it is most useful, either internally or externally; it will heal cuts and prevent chapping; it is a true remedy for constipation; it is of great assistance to anæmic people in forming new blood, and has been strongly recommended as a food to persons suffering from diabetes, who are not able to assimilate starchy foods; in fact, olive oil and ripe olives are invaluable, though little understood, adjuncts to health, and when the price charged is reduced to something within reason, there is no doubt they will come into general use."

Botany.

WEEDS AND POISONOUS PLANTS OF THE ATHERTON TABLELAND.

By C. T. WHITE, Government Botanist.

In January last, following instructions received from the Minister for Agriculture (Hon. Wm. Lennon), I paid a visit to the Atherton Tableland area, at the request of the Eacham Shire Council, for the purpose of inspecting properties where losses amongst stock had occurred, supposedly from eating poisonous weeds or scrub, and at the same time to make as complete a collection as possible of all plants known to be or suspected of being poisonous to stock; also all noxious weeds growing in the Shire, for exhibit at the next show to be held at Malanda under the auspices of the local Agricultural, Pastoral, and Industrial Society; hence specimens of most of those here noticed will be later forwarded on for that purpose.

The following is a list, with brief notes attached, of all weeds observed, and which were thought worth bringing under notice.

In all newly opened or comparatively new scrub areas, losses amongst stock from eating poisonous plants are likely to occur, especially where the secondary scrub growth has not yet been got rid of. Owing to the difficulty of accurately determining such growth, and our lack of knowledge on the properties of so many of our native plants, the subject is an exceedingly difficult one to handle.

It will be seen from the following list, however, that the area dealt with does not contain any very great number of definitely known poisonous plants, and the majority of those noticed, such as Bean-tree, Peach-leaf Bush, &c., being ones well known to stockowners.

Where reference is made to articles in the "Queensland Agricultural Journal," these can generally be had in reprint form from the Department upon application to the Under Secretary.

Apart from its local interest the following list will be found to have several records that will be of interest to the systematic botanist:—

1. *Stephania hernandiæfolia* (Tape Vine).—A common climber; all parts contain a poisonous alkaloid; an illustrated article with full information will be found in this Journal for October, 1917.

2. *Legnephora Moorei*.—On the Atherton Tableland this vine is known as "Native Grape," owing to the similarity in appearance of the carpels (fruit) to ordinary table grapes. It is closely allied to *Stephania*, and Dr. T. L. Bancroft found the root-bark to contain an active poisonous principle. The plant is often eaten by cattle and, as in *Stephania*, the poisonous principle probably extends through the whole plant. I am informed that children have been made violently ill through eating the fruit.

3. *Lepidium ruderale* (Pepper Grass or Wild Cress).—A rather common herb, with a strong biting cress or turnip taste; a bad weed to taint milk.

4. *Portulaca oleracea* (Pig Weed).—A common garden and cultivation weed; a useful fodder and pot herb; seed ground up into flour was at one time largely used by the inland aborigines for food.

5. *Malvastrum tricuspidatum*.

6. *Sida rhombifolia* (synonym—*Sida retusa*).

7. *Sida acuta*.

These three plants are all very common. No. 6 is the one generally known as *Sida retusa* and is the only one that should be properly so-called; Nos. 5 and 7 are commonly known as bastard *Sida retusa*. The *Malvastrum* is a lower-growing weed than the two *Sidas*, with rough stems, and is useless as a fodder; it is very common in cultivation paddocks, calf-pens, &c.

8. *Sida cordifolia* (Flannel Weed or White Burr).—Recently gazetted as a noxious weed throughout the State; occurs here and there, but not seen in any great quantity; it is one of the commonest and worst weeds about the Northern coastal towns, such as Townsville, Cairns, &c. An illustrated article on it will be found in this Journal for August, 1917.

9. *Urena lobata* (Chinese Burr or Pink Burr).—Probably the commonest weed; a native plant, but is widely spread over the tropical countries of the world.

10. *Triumfetta nigricans* (Black Burr).—I only saw one or two clumps of this. It can be distinguished by its small yellow flowers and by the carpels or "burr" having long, rather soft processes.

Triumfetta rhomboidea, which is the common Chinese Burr of the coast, I did not notice; but it probably occurs here and there. *Urena lobata* also occurs on the coast, and is also known as Chinese Burr. In Western Queensland the name of Chinese Burr is given to a totally different plant—*Bassia Birchii*, which is not found outside of Australia.

11. *Zanthoxylum veneficum* (Prickly Ash).—A common tree with a bright yellow wood, prickly stem, and glossy leaves, often with a reddish tinge. Commonly comes up in paddocks as scrub undergrowth and often simply known as "Prickly Bush." Dr. T. L. Bancroft, writing on this species, stated that the bark contained a poisonous principle as toxic as strychnine. As this probably extends to the leaves and as, moreover, cattle seem to readily eat them, the plant should be destroyed where seen.

12. *Oxalis corniculata* (Wood Sorrel or Sour Grass).—A little creeping clover-like plant with small yellow flowers; of no particular importance.

13. *Castanospermum australe* (Bean-tree, or Moreton Bay Chestnut).—The large brown seeds found lying under the tree are often the cause of mortality amongst stock. According to Dr. Greshoff the leaves contain

the same poisonous principle as the seeds, viz., saponin, and are likewise harmful to stock.

14. *Phaseolus semierectus*.—Was introduced as a fodder plant. I noticed a few plants about Atherton; of no particular importance.

15. *Crotalaria Mitchellii*.—A Rattlepod. A native plant more or less of a weed in many localities. Has been suspected of poisoning stock; but seldom, if ever, seems to be touched by them.

16. *Cassia laevigata* (Arsenic Bush).—One of the commonest weeds of the tableland; probably not poisonous, but would purge stock if eaten; but seldom, if ever, touched by them. It is a native of tropical America and tropical Africa, but has been established in Queensland for some years and is now a common weed of scrub areas from the Tweed northwards. This is different from the "Arsenic Plant" of Irvinebank and adjacent country, which is *Hibbertia Bennetti*.

17. *Cassia occidentalis* (Coffee Senna).—One of the commonest naturalised species of Cassia. An illustrated article dealing with it will be found in this Journal for January, 1916.

18. *Passiflora fœtida*.—"Love-in-a-mist" Passion Flower.

19. *Passiflora Herbertiana*.—Native Passion Vine.

Both these contain prussic acid and are therefore poisonous. The former can easily be told by its white flower and from the fruit being enclosed in a feathery calyx; the native one is a more robust, stronger-growing species with green fruit about the same size as or often a little bigger than the common passion fruit (*Passiflora edulis*).

20. *Bryonia laciniosa* (Bryony or Wild Melon).—A common vine in secondary growth and on the edge of scrubs; can easily be recognised by its red fruit with white, wavy streaks; the vines have often been accused of poisoning stock, and cases are on record where children have eaten the fruit with fatal results.

21. *Richardsonia scabra* (Mexican Clover).—A useless plant; has been praised as a fodder, but our experience with it in Queensland points to it being one of the most aggressive of pests. On the Atherton Tableland it goes under the name of "Fodder weed," the belief being that it was imported there with fodder imported during the last dry spell. Mr. Chas. Hampden informs me that it even got ahead of *Paspalum* on his place, which gives some idea of its pertinacity.

22. *Dichrocephala latifolia*.—This small native plant is a common weed on scrub tracks, roadsides, &c.; of no particular importance.

23. *Ageratum conyzoides* (Billygoat Weed or Blue Top).—Very common everywhere; introduced as a garden plant.

24. *Erigeron canadensis* (Canada Fleabane).—A North American plant; a very common weed in Queensland; in appearance very similar to the preceding.

25. *Erigeron linifolius* (Rag Weed).—A very tall-growing weed of ragged appearance; in some places known as "Cobbler's Pegs" owing to

the sharp woody stumps left after mowing the plant down having power enough to penetrate boot leather. This latter name is, however, almost universally given to *Bidens pilosa*. These species of *Erigeron* are especially weeds of cultivation.

26. *Bidens pilosa* (Cobbler's Pegs).—A very common weed.

27. *Niegesbeckia orientalis*.—A very prevalent weed; about Yungaburra called "Bastard Nettle" on account of the leaf bearing some slight resemblance to the small stinging nettle (*Urtica incisa*). On the Northern Rivers of New South Wales, I am informed, it goes under the name of "Pitchfork." It belongs, of course, to a very different family from the nettles and possesses no stinging properties.

28. *Acanthospermum hispidum* (Star Burr).—Too well known to need description; first made its appearance about Townsville about fourteen years ago; now one of the most troublesome pests of the North.

29. *Galinsoga parviflora* (Yellow Weed).—A South American plant which is now a common weed in the Australian States, principally of garden and field cultivation; an excellent green food for poultry.

30. *Erechthites valerianæfolia* (Federal Weed or Commonwealth Weed).—So called because it first made its appearance about the first year of the Australian Commonwealth; now a common weed of scrub land from the Tweed to the Cairns and Atherton districts; a pest sometimes, on account of its rapid and dense growth in new clearings preventing a good burn off; an excellent fodder; native of South America.

31. *Erechthites Atkinsonæ*.—A native plant somewhat resembling the Federal Weed, very common in New South Wales and Southern Queensland; not previously recorded from the North; often comes up very thickly in newly felled scrub, and has no advantages as a fodder to recommend it like the Federal Weed; by some, it is called "Rag Weed," a sobriquet applied to several different plants in Queensland.

32. *Emilia sonchifolia*.—A small weed with purple flower-heads, otherwise resembling a small growth of the common Sow or Milky Thistle; of no particular importance.

33. *Sonchus oleraceus* (Sow Thistle or Milky Thistle).—A cosmopolitan weed.

34. *Unicus lanceolatus* (Spear or Scotch Thistle).—Getting a good hold here and there; one of the worst of our introduced pests. The true heraldic thistle of Scotland is *Onopordon acanthium*, a species which, so far, has not made its appearance in Queensland, though naturalised in the Southern States.

35. *Scaevola cnantophylla* (Snake Vine).—Several residents pointed this out to me as a plant poisonous to stock, and Mr. C. Hampden, of Rockley's Pocket, told me that he had more than once noticed its effect on stock. I brought down a quantity, but owing to the hot, moist weather experienced it did not reach Brisbane in a condition suitable for chemical examination. It is a very different plant to those which go under the name of "Snake Vines" in Southern parts, and which belong to the genus *Hibbertia*.

36. *Asclepias curassavica* (Red Head or Milky Cotton Bush).—Rather common here and there; generally regarded as poisonous to stock. An illustration and full account of this weed will be found in this Journal for December, 1898.

37. *Gomphocarpus physocarpus* (Wild Cotton).—A tall-growing aggressive weed, only noticed in one or two places; easily recognised by its balloon-like pods full of dark-brown seeds, with a tuft of fine, silky cotton attached; when broken, any part of the plant exudes a milky juice. Another species of *Gomphocarpus* commoner in Queensland, but which I did not see on the tableland, is *G. fruticosus*. An illustrated article on these two weeds appeared in this Journal for August, 1916.

Asclepiadeæ.—Belonging to the same natural order or family (*Asclepiadeæ*) as the two last-mentioned plants. *Asclepias* and *Gomphocarpus* are a number of scrub vines often seen in paddocks climbing over fallen logs, large stumps, &c. These vines, though not definitely known to be poisonous, should be destroyed where seen, as the family is a dangerous one, containing a number of poisonous plants. They can generally be distinguished by the following characteristics:—The leaves are opposite on the stem; the stem and often any parts of the plants readily exude a milky juice when cut; the seed-pods (follicles) are full of seeds with long tufts of silky white hairs attached.

38. *Cynoglossum australe* (Forget-me-not).—A native herbaceous weed; fairly common; bears long branches of white or bluish forget-me-not-like flowers, followed by small 4-lobed burrs; though a burr plant, not a particularly aggressive species.

Solanum.—A very large genus of plants widely distributed over the world; contains such well-known plants as the Potato, Egg Fruit, &c. On the tableland I noticed as weeds about half a dozen indigenous species; quite a number of our native species are more or less troublesome weeds in different parts of the State, and often go under the vernacular of "Potato Bushes."

39. *Solanum nigrum** (Blackberry or Black Currant).—A common weed; the green plant suspected as being poisonous to stock, but seldom touched by them; the fruits are often eaten cooked without any ill effects.

40. *Solanum aviculare* (Kangaroo Apple).—A large, succulent species with berries about the size and shape of a pigeon's egg; a handsome plant in its young stage, bearing large deeply-lobed leaves; hence on the tableland and elsewhere it commonly, though of course erroneously, goes under the name of "Castor Oil Bush." Dr. T. L. Bancroft found the plant to contain a volatile alkaloid poison.

41. *Solanum verbascifolium* (Wild Tobacco).—A tall much-branched shrub with densely hairy leaves, white flowers, and bunches of round berries; a common weed of practically all coastal scrub country in Queensland; contains a poisonous alkaloid; generally goes under the

* According to a recent research by Mr. E. Cheel, there are three distinct species or subspecies which have gone under the name of *Solanum nigrum* in Australia; according to his classification, the common species that occurs on the tableland would be *S. pterocaulon*.

local name above given, though we have several sorts of *Nicotiana* (true tobaccos) native to Queensland; it is these latter that are so often recorded as poisoning stock on the Downs and Western country.

42. *Solanum aculeatissimum* (Devil's Apple).—A very thorny species with white flowers followed by bright scarlet fruits about 1 in. in diameter.

43. *Solanum viride*.—A very common shrub in the scrubs, especially along the edges and roadsides where clearings have been made; attains a large size.

44. *Solanum sporadotrichum*.—A very prickly species; common.

45. *Solanum species* (Dirran Curse).—About Tarzali and the Dirran, a large, scrambling prickly *Solanum* is very common. My specimens do not allow me to make it out specifically, and it is quite possible that it is an undescribed species.

46. *Physalis peruviana* (Cape Gooseberry).—Very common.

47. *Physalis minima* (Wild Gooseberry).—This species is a native, and the fruit, though not known to possess any harmful properties, is very disagreeable in flavour.

48. *Capsicum fastigiatum* (Common Chilli).—One of the commonest naturalised weeds on the tableland.

49. *Duboisia myoporoides* (A Corkwood).—Seldom touched by stock, but supposed to cause blindness and death when eaten; an extract from the leaves has been used in ophthalmic surgery for the purpose of dilating the pupil of the eye, and before the war the leaves were an article of export to Germany, though not, I believe, in any great quantity. J. H. Maiden, Government Botanist of New South Wales, in an article on the plant, stated: "The leaves are poisonous (though not violently so), but accidents from them are rare. Last year, however, two children in the Richmond River district chewed them and suffered from general nervous and muscular derangement accompanied by delirium. They recovered."

50. *Verbascum virgatum* (Twiggy Mullein).—A native of Southern Europe; a naturalised weed in many parts of the State; of no particular importance. An illustration and description are given in this Journal for January, 1918.

51. *Scoparia dulcis*.—A very common weed.

52. *Lantana camara*.—I am informed that *Lantana* has made its appearance in one or two places, but, so far, has been destroyed wherever seen; I did not see any on the tableland myself.

53. *Verbena bonariensis* (Purple Top).—A native of South America; now one of the commonest and most aggressive weeds in Queensland.

Amarantus.—Of this genus we have seven native and two naturalised species. They are all more or less common weeds; form perfectly wholesome fodder, and the young tops of the shoots can be used as a pot herb as a substitute for spinach.

54. *Amarantus spinosus* (Needle Burr).—One of the commonest and most troublesome weeds on the tableland.

55. *Amarantus paniculatus** (Fat Hen).—Very common in cultivation; a large succulent weed, growing to a great height, and commonly known on the tableland as "Fat Hen," a local name applied in Queensland to a great many plants of the *Amarantaceæ* and *Chenopodiaceæ*.

56. *Amarantus interruptus*.

57. *Amarantus viridis*.

These two species are common weeds of cultivation.

58. *Chenopodium carinatum*.—A strongly scented, low-growing weed generally found in cultivation areas, alongside of fallen logs, in calf-pens, and, in fact, anywhere where the ground has been broken.

59. *Phytolacca octandra* (Ink Weed).—Common everywhere.

60. *Rivina lavis*.—A fairly common weed of the ink weed family, of no particular importance.

61. *Daphnandra repandula*.

62. *Daphnandra aromatica*.—Yellow Sassafras.

In the bark of these two species Dr. T. L. Bancroft found a poisonous principle which possibly extends to the leaves, and as, with other scrub trees, sucker growth may sometimes be seen in paddocks it is perhaps as well to include them in this list.

63. *Euphorbia pilulifera* (Asthma Plant).—A weed of cultivation; tea made from the dried plant gives great relief to people suffering from asthma.

64. *Ricinus communis* (Castor Oil Plant).—A naturalised weed in many parts of Queensland. Persons have been known to have been made violently ill from eating the seeds under the impression that it would have the same effect as castor oil; in addition to the oil, however, the seeds contain a poisonous albuminoid-ricinin.

65. *Homalanthus populifolius* (Bleeding Heart or Native Poplar).—Can hardly be termed a weed, but is noticed here as for some years it was looked upon as poisonous to stock, and the vernacular of "Bulli Poison Bush" was attached to it. Feeding experiments carried out in New South Wales, however, have proved the plant to be in no way harmful, and on the Atherton Tableland it is looked upon as an excellent fodder, several dairymen telling me that they had cut down large supplies of it for their cattle during the last dry spell, and that the stock did well on it.

66. *Trema aspera* (Peach-leaf Poison Bush).—A common shrub. As far as I observed this typical or shrubby form appears to be limited to the forest country; bears small, rough, hairy leaves.

67. *Trema aspera*, var. *viridis* (Peach-leaf Poison Bush).—This form is very common in the scrub country; it can be distinguished by its light-green, thin, almost membranous leaves, and is regarded by many

*I am not too sure as to the plant that is such a common weed in Queensland, and which has always gone under this name, does not better belong to *A. retroflexus*. The two are very closely allied, and I am not absolutely certain to which species our plant more rightly belongs.

dairymen as the worst of the three forms that occur on the tableland. It is worth recording here that H.C.N. has been recorded from the closely allied East Indian *Trema virgata*. Several tests have been made by Mr. F. Smith, B.Sc., and the writer with the different forms in Queensland, but with negative or doubtful results. It is generally conceded that the bad effects are worse in a dry time when other feed is scarce, and it is more than likely that the action of the plant is a mechanical one, causing severe constipation.

68. *Trema amboinensis* (Peach-leaf Poison Bush).—This form attains tree size. It can usually be distinguished by its large, thick, densely hairy leaves, sometimes measuring nearly 1 ft.

69. *Urtica incisa* (Stinging Nettle).—Common on the edge of scrubs, roadsides, new clearings, &c. A native plant; generally known in Queensland (erroneously) as the "English Nettle."

70. *Laportea gigas* (Stinging Tree).—Very common; though apparently the same species as occurs in New South Wales and Southern Queensland, in the tableland area I never saw any that attained a size bigger than what one could call a large shrub; in the South it grows to a tree of about 100 ft. high. Dr. J. L. Petrie, working on the stinging property of this plant, stated that the sting was undoubtedly due to free acid existing in a concentrated form in the hairs. He further states: "Common nettle plant contains 0.002 per cent formic acid; nettle tree contains 0.179 per cent. free acid (0.002 per cent. formic acid and 0.179 acetic)—that is, *Laportea gigas* contains 90 per cent. more free acid than *Urtica urans*. The amount of strong acid injected under the skin by one of the large hairs is quite a sufficient cause for the severe shock which follows the sting." The common nettle he refers to would probably possess similar stinging properties to those of *Urtica incisa*.

71. *Laportea photiniphylla* (Glossy-leaf or Shining-leaf Stinging Tree).—Often called "Mulberry-leaf Stinging Tree" on account of the similarity of the leaves to those of the common mulberry.

72. *Laportea moroides* (Gympie Nettle).—Very similar in general appearance to *Laportea gigas*.

73. *Cycas media* (Zamia Palm).—Practically all the Australian members of the order Cycadaceæ are looked upon as the cause amongst stock of the complaint known as "Rickets."

74. *Bowenia spectabilis* (Zamia Fern or Ricket Fern).—Very common in places, and looked upon as decidedly harmful, having the same effect on stock as other members of the family Cycadaceæ.

75. *Alocasia macrorrhiza*.—Cunjevoi.

76. *Colocasia antiquorum*.—Taro.

These two Aroids are common in wet scrub localities; though eaten after being cooked by the natives, they possess, in addition to a cyanogenetic glucoside (prussic acid), an extremely acrid principle that has a most unpleasant effect on the mouth and throat when the thick root-stock or any other part of the plant is tasted in a raw state.

77. *Paspalum Galmarra* (Russell River Grass).—Very common on the tableland, and generally looked upon there as almost worthless as a fodder; at one time was praised as a dairy grass and introduced into the South, but now never seen there.

78. *Paspalum platycaule* (Carpet Grass).

79. *Paspalum conjugatum* (Johnstone River Grass).

I draw attention to these two grasses, not because they can be termed weeds in the ordinary sense, but owing to the confusion between them. They are to be seen, more often than not, growing intermixed, and no distinction is made between them by dairymen, both going under the name of Johnstone River Grass, and being looked upon more as weeds than useful pasture grasses. This is rather strange, as *Paspalum platycaule* is regarded as one of the best pasture grasses for the tropics.

80. *Panicum sanguinale* (Summer Grass).—A weed of cultivation.

81. *Tricholena Teneriffæ* (Red Natal Grass).—Introduced as a fodder grass, but only of poor value; it is often listed in seedsmen's catalogues as an ornamental species.

82. *Cenchrus australis* (Scotch Lice).—A pestilential burr grass; common along the edge of scrubs, roadsides, &c.; gazetted a noxious weed within the Eacham Shire. The local name is misleading, as the grass is a native of Australia, not an introduction.

83. *Cenchrus echinatus* (Mossman River Grass).—A common tropical pestilential burr grass; not previously recorded from Queensland.

84. *Imperata arundinacea* (Blady Grass).—"Lalang" of the Malay States. Common.

85. *Eleusine indica* (Crowfoot Grass).—Common along roadsides, cultivation areas, and, in fact, anywhere where the land has been broken; it contains a fair quantity of prussic acid, and, though a nutritious fodder, may, perhaps, be the cause of death when eaten in fair quantities. An illustration and description will be found in this Journal for August, 1914.

86. *Pteris aquilina*, var. *esculenta*.—Common Bracken.

87. *Pteris aquilina*, var. *lanuginosa*.—Woolly Bracken.

Both of these forms occur on the tableland. In Europe and North America the common Bracken has been accused of poisoning stock, but the accounts are conflicting. I have never heard of any of the Australian forms causing harm to stock in any way.

88. *Lepiota dolichaulos* (Toadstool).—In the "Agricultural Gazette" of New South Wales for December, 1909, attention is drawn to this fungus as the probable cause of death among some cattle on the Richmond River. This is the common large toadstool with a cap about the size and shape of an ordinary dinner plate, and which comes up so thickly in paddocks on scrub areas in Queensland. On the Atherton Tableland several dairymen informed me that pigs and other stock eat them greedily without apparently any ill effects.

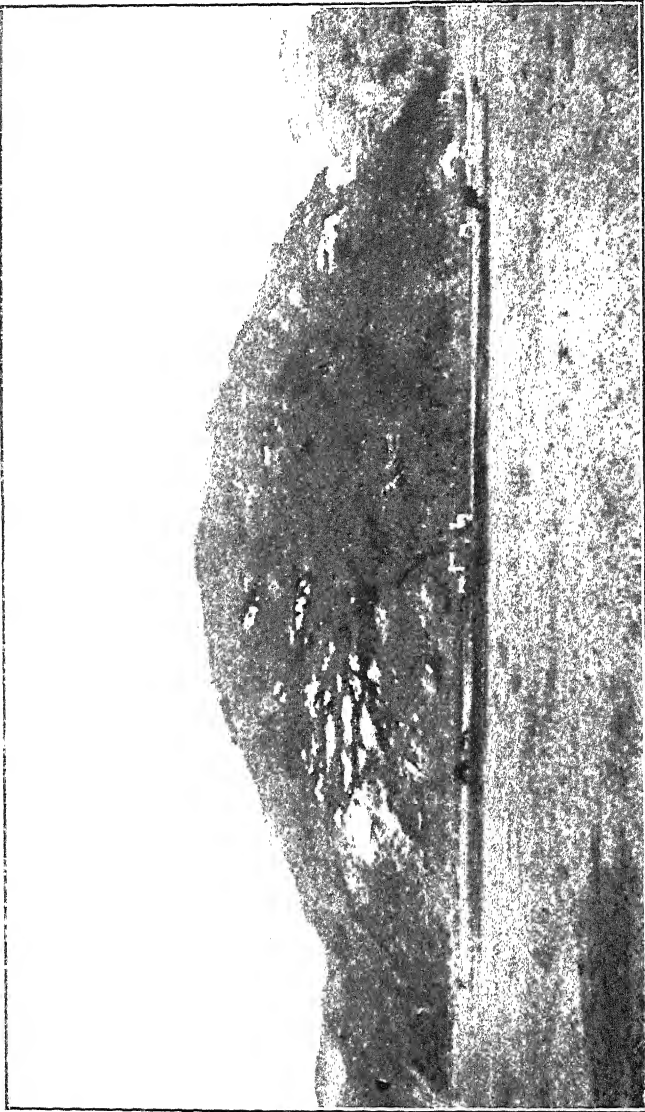


PLATE 13.—TREE OF *Pithecolobium saman*, Benth.

Growing in Trinidad, British West Indies. Described in March issue of the Journal, page 94. Spread of branches = 300 feet; area covered by branches = 1 acre 2 roods 19 perches.

Answers to Correspondents.

HOME-CURING HAMS AND BACON.

FARMER'S WIFE, Toowoomba—

We have given several recipes for curing hams and bacon in the Journal. Here is one, recommended in the "Farm Journal," Sydney:—

"The cause of hardness in bacon referred to is due to the excessive use of saltpetre, especially through using it during the first stages of curing. For home curing a suitable recipe is as follows:—Weigh out for each 100 lb. of meat 5 lb. of salt, 2 lb. of brown sugar, and 2 oz. of saltpetre. When the carcass is thoroughly set, cut up and salt lightly; then lay it overnight upon a clean concrete floor or table. By salting lightly is meant that as much salt as will cover the meat comfortably without undue waste be used. Next morning brush the salt off thoroughly; then dry-salt the meat with dry salt and brown sugar rubbed well in daily for three days. On the fourth and fifth days a little saltpetre should be added to the salt and sugar, which should be well rubbed in, especially on the skin. Leave the bacon and hams in the mixture (dry salt and brown sugar) for about three weeks; but they should be turned every day or second day; at the same time continue rubbing during this period. Then wash clean, when the bacon and hams will be ready for smoking, the duration of which depends upon the taste of the manufacturer. After the first week or ten days, it is advisable to brush the salt and sugar off the inner side of the thin parts of the bacon (flaps). Note that dry salting should only be undertaken in cold weather and in a cool place."

W. G. Gray, Ravenshoe, N.Q.—

1. *Re* branding on one side of cattle?—This applies to all registered brands.
2. It is impossible to say at what age a bull becomes of no further use for service, as this varies with the animal, the feeding, and the amount of service he is given?—If properly attended to and not overworked, he may go on until ten or twelve years of age.
3. A defence that a receipt received for a cheque subsequently dishonoured represents complete payment for goods could never be sustained. A person taking a cheque could, in the event of the cheque being dishonoured, sue the debtor for the amount.

REMEDY AGAINST CANE RATS.

THOS. LOVE, Ingham—

With reference to your request for a remedy against cane rats, Mr. H. T. Easterby, General Superintendent of Sugar Experiment Stations, states that considerable success was obtained by Mr. Jodrell, of Innisfail, in the poisoning of rats by grinding up strychnine into a powder and placing it over baits such as bread and butter and cut bananas. Mr. Jodrell anoints his hands with oil of aniseed before preparing the baits. At Mossman pellets of tallow impregnated with strychnine and aniseed oil have been thrown amongst the cane and found to work successfully. Corn boiled in a strong solution of strychnine has also been effectively used in sugar districts.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MARCH, 1918.

Article.		MARCH.	
		Prices.	
Bacon	lb.	9d. to 10d.	
Barley	bush.	2s. 6d. to 3s.	
Bran	ton	£5 10s.	
Broom Millet	"	£33 to £38	
Butter (First Grade)	cwt.	149s. 4d.	
Chaff, Mixed	ton	£4 to £4 10s.	
Chaff, Oaten	"	£5 to £6 5s.	
Chaff, Lucerne	"	£4 10s. to £5 10s.	
Chaff, Wheaten	"	£4 to £4 10s.	
Cheese	lb.	9½d. to 10d.	
Flour	ton	£12	
Hams	lb.	1s. 3d. to 1s. 10d.	
Hay, Oaten	ton	£6 10s. to £7.	
Hay, Lucerne	"	£3	
Hay, Wheaten	"	...	
Honey	lb.	2½d. to 3½d.	
Maize	bush.	3s. 6d. to 3s. 10d.	
Oats	"	2s. 6d. to 2s. 10d.	
Onions	ton	£6 10s. to £8 10s.	
Peanuts	lb.	5d. to 7d.	
Pollard	ton	£7 5s.	
Potatoes	"	£2 10s. to £7.	
Potatoes (Sweet)	"	£2 10s. to £3.	
Pumpkins (Cattle)	"	£2 to £3	
Eggs	doz.	1s. to 1s. 10d.	
Fowls	per pair	3s. 6d. to 5s. 6d.	
Ducks, English	"	3s. to 3s. 9d.	
Ducks, Muscovy	"	5s. to 5s. 6d.	
Geese	"	6s. 6d. to 8s. 6d.	
Turkeys (Hens)	"	9s. to 11s.	
Turkeys (Gobblers)	"	15s. to 22s. 6d.	
Wheat (Milling)	bush.	4s. 6d. to 4s. 7d.	

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen bundles ... ..	...
Cabbages, per dozen	4s. to 7s.
Beans, per sugar-bag	7s. to 15s.
Peas, per sugar-bag	6s. to 15s.
Carrots, per sugar-bag	2s. 6d. to 5s.
Cauliflowers, per dozen ... ..	...
Chokos, per case	1s. 9d. to 2s.
Beetroot, per sugar-bag	6d. to 9d.
Lettuce, per dozen	1s. to 1s. 6d.
Parsnips, per dozen bundles	6d. to 1s.
Sweet Potatoes, per sugar-bag	1s. 6d. to 3s.
Table Pumpkins, per dozen	6s. to 6s. 6d.
Marrows, per dozen	1s. to 4s.
Tomatoes, per quarter-case	2s. to 6s.
Cucumbers, per dozen	6d. to 8d.

SOUTHERN FRUIT MARKETS.

Article.	MARCH.				
	Prices.				
Bananas (Queensland), per case	6s. to 12s.
Bananas (Tweed River), per case	3s. to 14s.
Bananas (Fiji), per bunch...	5s. to 6s.
Bananas (G.M.), per bunch	5s. to 6s.
Lemons (local), per bushel-case
Mangoes, per case	4s. to 5s.
Mandarins, per case
Oranges (Navel), per case
Oranges (Queensland), per case	7s. to 14s.
Papaw Apples, per half-case	6s. to 7s.
Passion Fruit, per half-case	4s. to 8s.
Pineapples (Queens), per double-case	8s. to 12s.
Pineapples (Common), per double-case	6s. to 8s.
Tomatoes (Queensland), per quarter case	1s. 6d. to 3s.
Cucumbers, per bushel case
Strawberries, per lb.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	MARCH.				
	Prices.				
Apples, Eating, per case	3s. to 7s.
Apples, Cooking, per case	3s. to 7s.
Apricots, per case
Bananas (Cavendish), per dozen	3d. to 5d.
Bananas (Sugar), per dozen	2d. to 6d.
Cape Gooseberries, per quarter-case
Cherries, per box
Citrons, per hundredweight	7s. to 8s.
Cocoanuts, per sack	15s. to 25s.
Cumquats, per quarter-case
Custard Apples, per tray	2s. 6d. to 4s.
Lemons (Lisbon), per quarter-case	7s. to 10s.
Mandarins, per case	7s. to 10s.
Mangoes, per quarter-case	4s. to 4s. 6d.
Oranges (Navel), per case	8s. to 10s.
Oranges (Seville), per hundredweight
Oranges (other), per case	5s. to 10s.
Papaw Apples, per quarter-case	2s. to 2s. 6d.
Passion Fruit, per half-bushel case	5s. to 7s.
Peaches, per quarter-case	2s. to 4s.
Pears, per half-bushel case
Peanuts, per lb.	5d. to 7d.
Persimmons, per quarter-case	1s. 8d. to 2s.
Pineapples (Ripleys), per dozen	1s. to 3s. 6d.
Pineapples (Rough), per dozen	1s. to 3s. 6d.
Pineapples (Smooth), per dozen	6d. to 1s. 6d.
Plums, per quarter-case	6s. to 8s.
Rockmelons, per dozen
Strawberries, per dozen boxes
Tomatoes, per quarter-case	2s. to 6s.
Watermelons, per dozen

TOP PRICES, ENOGGERA YARDS, FEBRUARY, 1918.

Animal.	FEBRUARY.	
	Prices.	
Bullocks	£23 5s. to £26 2s. 6d.	
Cows	£15 10s. to £17 15s.	
Cows (Single) ... ..	...
Merino Wethers	42s. 9d.	
Crossbred Wethers	42s.	
Merino Ewes	30s.	
Crossbred Ewes	38s.	
Lambs	37s. 3d.	
Pigs (Baconers) ... ..	...
Pigs (Porkers)	47s. 6d.	
Pigs (Slips) ... ..	...

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF FEBRUARY, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING FEBRUARY, 1918 AND 1917, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Feb.	No. of Years' Records.	Feb., 1918.	Feb., 1917.		Feb.	No. of Years' Records.	Feb., 1918.	Feb., 1917.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
Atherton	In.	17	In.	9'62	Nambour	In.	...	In.	...
Cairns	9'67	36	18'06	6'09	Nanango	8'96	22	5'67	5'58
Cardwell	14'93	46	16'98	22'09	Rockhampton	4'54	36	2'91	1'68
Cooktown	17'02	42	13'48	11'57	Woodford	7'82	31	8'20	5'58
Herberton	13'61	31	10'02	7'79		9'32	31	9'33	3'02
Ingham	7'49	26	18'40	23'93	<i>Darling Downs.</i>				
Innisfail	15'65	37	20'07	19'20	Dalby	2'98	48	2'17	3'45
Mossman	22'07	37	20'07	19'20	Emu Vale	2'45	...	1'13	2'73
Townsville	15'13	10	15'36	17'95	Jimbour	3'09	...	0'42	1'68
	12'16	47	7'12	20'06	Miles	2'75	33	3'36	4'12
<i>Central Coast.</i>					Stanthorpe	3'45	45	0'86	4'29
Ayr	9'43	31	8'30	10'49	Toowoomba	4'57	46	2'26	6'85
Bowen	8'79	47	14'66	12'04	Warwick	3'05	31	2'30	2'57
Charters Towers	4'40	36	11'26	7'45	<i>Maranoa.</i>				
Mackay	11'77	47	9'89	18'02	Roma	3'17	44	0'17	4'88
Proserpine	10'96	15	13'34	14'15	<i>State Farms, &c.</i>				
St. Lawrence	8'26	47	7'49	10'58	Bungewongorai	3'02	4	0'45	4'43
<i>South Coast.</i>					Gatton College	3'26	...	1'59	4'01
Biggenden	3'88	...	4'15	2'93	Gindie	2'75	...	5'84	6'17
Bundaberg	6'45	35	5'62	8'46	Hermitage	2'56	...	1'59	2'83
Brisbane	6'57	67	2'25	1'64	Kairi	6'18	4	...	8'99
Childers	6'17	23	8'89	6'73	Kamerunga	14'09	...	13'35	7'41
Crohamhurst	15'03	25	7'88	6'97	Sugar Experiment Station, Mackay	10'37	...	11'77	14'80
Esk	5'94	31	2'18	3'89	Warren	3'92	4	10'96	7'25
Gaydah	4'26	47	4'95	3'11					
Gympie	6'75	48	7'28	2'84					
Glasshouse M'tains	9'50	10	9'03	3'90					
Kilkivan	5'24	39	4'07	2'33					
Maryborough	6'67	47	7'39	6'28					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for February this year, and for the same period of 1917, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

Farm and Garden Notes for May.

FIELD.—During this month, the principal work in the field will be the sowing of wheat, barley, oats, rye, and vetches. There is no time to lose now at this work. Potatoes should be hilled up. Cut tobacco. The last of the cotton crop should now be picked, the bushes being stripped daily after the dew has evaporated. Cotton-growers are notified that cotton-ginning and baling machinery has been installed on the premises of the Department of Agriculture and Stock in William street, where seed cotton will be received by the department from the growers, to whom an advance of 1½d. per lb. will be paid. The cotton will then be ginned, baled, and marketed in the best market, and whatever balance to credit is shown when account sales are received will be distributed amongst the suppliers according to the amount of cotton supplied by them. Only bare expenses of preparing the shipments and freight, if the cotton is exported, will be deducted. Thus it will be seen that cotton-growers will have a sure market for their produce. Every effort should be made to ensure feed for stock during the winter by utilising all kinds of green fodder in the form of silage or hay. Those who own dairy stock will be wise to lay down permanent grasses suitable to their particular district and soil. A few acres of artificial grass, notably Rhodes grass, will support a surprisingly large number of cattle or sheep in proportion to acreage. Couch grass in the West will carry ten to twelve sheep to the acre. Coffee-picking should now be in full swing, and the berries should be pulped as they are picked. Strawberries may be transplanted. The best varieties are Pink's Prolific, Aurie, Marguerite, Annetta, Phenomenal, Hautbois, and Trollope's Victoria. Aurie and Marguerite are the earliest. In some localities, strawberry planting is finished in March, and the plants bear their first fruits in August. In others, fruit may be gathered in July, and the picking does not end until January.

KITCHEN GARDEN.—Onions which have been planted in seed beds may now be transplanted. The ground should long since have been thoroughly cleaned, pulverised, and should be rolled previous to transplanting. Onions may still be sown in the open on clean ground. In favourable weather plant out cabbages, cauliflowers, lettuce, leeks, beetroot, endive, &c. Sowings may also be made of all these as well as of peas, broad beans, kohlrabi, radishes, spinach, turnips, parsnips, and carrots. Dig and prepare beds for asparagus.

FLOWER GARDEN.—Planting and transplanting may be carried out simultaneously during this month in showery weather; the plants will thus be fully established before the early frosts set in. Camellias and gardenias may be safely transplanted, also such soft-wooded plants as verbenas, petunias, pentstemons, heliotrope, &c. Cut back and prune all trees and shrubs ready for digging. Dahlia roots should be taken up and placed in a shady situation out of doors. Plant bulbs such as anemones, ranunculus, snowflakes, freesias, ixiads, watsonias, iris, narcissus, daffodils, &c. Tulips will not suit the Queensland climate, but hyacinths may be tried, although success is doubtful. All shades and screens may now be removed to enable the plants to get the full benefit of the air. Fork in the mulching, and keep the walks free from weeds. Clip hedges and edgings.

Orchard Notes for May.

THE SOUTHERN COAST DISTRICTS.

The advice given respecting the handling and marketing of citrus fruits in the last two numbers of this Journal applies with equal force to this and the following months. Do not think that you can give the fruit too much care and attention; it is not possible, as the better they are handled, graded, and packed the better they will carry, and the better the price they will realise.

Continue to pay careful attention to specking, and fight the blue mould fungus everywhere. Don't let mouldy fruit lie about on the ground, hang on the trees, or be left in the packing-shed, but destroy it by burning. Keep a careful lookout for fruit fly, and sweat the fruit carefully before packing. If this be done, there will be little fear of the fruit going bad in transit or being condemned on its arrival at Southern markets. Where the orchard has not been already cleaned up, do so now, and get it in good order for winter. Surface working is all that is required, just sufficient to keep moisture in the soil; keep down undergrowth, and prevent the packing of the surface soil by trampling it down when gathering the fruit.

Keeping the orchard clean in this manner enables any fallen fruit to be easily seen and gathered, and it need hardly be stated, what has been mentioned many times before, that diseased fruit should on no account be allowed to lie about and rot on the ground, as this is one of the most frequent causes of the spreading of many fruit pests.

May is a good month to plant citrus trees, as if the ground is in good order they get established before the winter, and are ready to make a vigorous growth in spring.

Don't plant the trees, however, till the land is ready, as nothing is gained thereby, but very frequently the trees are seriously injured, as they only make a poor start, become stunted in their growth, and are soon overtaken by trees planted later, that are set out under more favourable conditions. The land must be thoroughly sweet, and in a good state of tilth—that is to say, deeply worked, and worked down fine. If this has been done, it will probably be moist enough for planting; but should there have been a dry spell, then, when the hole has been dug and the tree set therein, and the roots just covered with fine top soil, 4 to 8 gallons of water should be given to each tree, allowed to soak in, and then covered with dry soil to fill up the hole. In sound, free, sandy loams that are naturally scrub soils, holes may be dug and the trees planted before the whole of the ground is brought into a state of perfect tilth. It is, however, better to do the work prior to planting, as it can then be done in the most thorough manner; but if this is not found possible, then the sooner it is done after planting the better. If the land has been thoroughly prepared, there is no necessity to dig big holes, and in no case should the holes be dug deeper than the surrounding ground either is or is to be worked. The hole need only be big enough to allow the roots to be well spread out, and deep enough to set the tree at the same depth at which it stood when in the nursery. Plant worked trees 24 to 25 ft. apart each way, and seedlings at least 30 ft. apart each way.

Towards the end of the month cover pineapples when there is any danger of frost; dry blady grass or bush hay is the best covering. Keep the pines clean and well worked—first, to retain moisture; and, secondly, to prevent injury from frost—as a patch of weedy pines will get badly frosted when a clean patch alongside will escape without any serious injury.

Slowly acting manures—such as meatworks manure when coarse, boiling-down refuse, farm manure, or composts—may be applied during the month, as they will become slowly available for the trees' use when the spring growth takes place; but quickly-acting manures should not be applied now.

THE TROPICAL COAST DISTRICTS.

May is a somewhat slack month for fruit—pines, papaws, and granadillas are not in full fruit, the autumn crop of citrus fruit is over, and the spring crop only half-grown. Watch the young citrus fruit for Maori, and when it makes its appearance spray with the sulphide of soda wash. Keep the orchard clean, as from now till the early summer there will not be much rain, and if the orchard is allowed to run wild—viz., unworked and dirty—it is very apt to dry out, and both the trees and fruit will suffer in consequence.

Bananas should be kept well worked for this reason, and, though the fly should be slackening off, every care must still be taken to prevent any infested fruit being sent to the Southern markets.

Citrus fruits can be planted during the month, the remarks *re* this under the heading of the Southern Coast Districts being equally applicable here.

THE SOUTHERN AND CENTRAL TABLELANDS.

Get land ready for the planting of new deciduous orchards, as, although there is no necessity to plant so early, it is always well to have the land in order, so as to be ready to plant at any time that the weather is suitable. The pruning of deciduous trees can commence towards the end of the month in the Stanthorpe district, and be continued during June and July. It is too early for pruning elsewhere, and too early for grapes, as a general rule. Keep the orchard clean, particularly in the drier parts. In the Stanthorpe district the growing of a crop of blue or grey field peas, or a crop of vetches, between the trees in the older orchards is recommended as a green manure. The crop to be grown as a green manure should have the soil well prepared before planting, and should be manured with not less than 4 cwt. of phosphatic manure, such as Thomas phosphate, or fine bonedust, per acre. The crop to be ploughed in when in the flowering stage. The granitic soils are naturally deficient in organic matter and nitrogen, as well as phosphoric acid, and this ploughing in of a green crop that has been manured with a phosphatic manure will have a marked effect on the soil.

Lemons will be ready for gathering in the Roma, Barcaldine, and other districts. They should be cut from the trees, sweated, and cured down, when they will keep for months, and be equal in quality to the imported Italian or Californian fruit. If allowed to remain on the trees, the fruit becomes over-large and coarse, and is only of value for peel. Only the finest fruit should be cured; the larger fruit, where the skin is thicker, is even better for peel, especially if the skin is bright and free from blemish; sealy fruit, scabby, warty, or otherwise unsightly fruit is not suitable for peel, and trees producing such require cleaning or working over with a better variety, possibly both.

The remarks *re* other citrus fruits and the work of the orchard generally, made when dealing with the coast districts, apply equally well here, especially as regards handling the crop and keeping down pests.

ASTRONOMICAL DATA FOR QUEENSLAND.

Times Computed by D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		PHASES OF THE MOON.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	4:57	6:46	5:21	6:41	5:41	6:19	5:58	5:46	The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.
2	4:58	6:46	5:22	6:41	5:41	6:18	5:59	5:45	
3	4:59	6:46	5:23	6:40	5:42	6:17	5:59	5:44	
4	4:59	6:46	5:24	6:40	5:43	6:16	6:0	5:43	<div>h. m.</div> 5 Jan. ☾ Last Quarter 9 49 p.m. 13 " ● New Moon 8 36 a.m. 20 " ☾ First Quarter 12:38 " 27 " ○ Full Moon 1 14 p.m.
5	5:0	6:46	5:25	6:39	5:44	6:15	6:0	5:42	
6	5:1	6:47	5:25	6:39	5:45	6:14	6:1	5:41	
7	5:2	6:47	5:26	6:38	5:45	6:13	6:1	5:39	The Moon will be at Perigee on 15th, Apogee on 3rd and 31st.
8	5:3	6:47	5:27	6:37	5:46	6:12	6:2	5:38	
9	5:3	6:47	5:28	6:36	5:46	6:11	6:2	5:37	
10	5:4	6:48	5:29	6:35	5:47	6:10	6:3	5:36	4 Feb. ☾ Last Quarter 5 52 p.m. 11 " ● New Moon 8 5 " 18 " ☾ First Quarter 10 57 a.m. 26 " ○ Full Moon 7 35 p.m.
11	5:5	6:48	5:29	6:35	5:47	6:9	6:3	5:35	
12	5:6	6:47	5:30	6:34	5:48	6:8	6:4	5:34	
13	5:6	6:47	5:31	6:33	5:48	6:7	6:4	5:33	The Moon will be at Perigee on 12th, Apogee on 28th.
14	5:7	6:47	5:32	6:32	5:49	6:6	6:5	5:32	
15	5:8	6:47	5:32	6:32	5:49	6:5	6:5	5:31	
16	5:9	6:47	5:33	6:31	5:50	6:3	6:6	5:30	6 Mar. ☾ Last Quarter 10 44 a.m. 13 " ● New Moon 5 52 p.m. 19 " ☾ First Quarter 11 30 " 28 " ○ Full Moon 1 33 "
17	5:9	6:47	5:34	6:30	5:50	6:2	6:6	5:29	
18	5:10	6:47	5:35	6:29	5:51	6:1	6:7	5:28	
19	5:11	6:47	5:35	6:28	5:51	6:0	6:7	5:27	The Moon will be at Perigee on 13th, Apogee on 27th.
20	5:12	6:46	5:36	6:28	5:52	5:59	6:8	5:26	
21	5:13	6:46	5:37	6:27	5:52	5:58	6:8	5:25	
22	5:13	6:46	5:37	6:26	5:53	5:57	6:8	5:24	4 April ☾ Last Quarter 11 33 p.m. 11 " ● New Moon 2 34 " 18 " ☾ First Quarter 2 8 " 26 " ○ Full Moon 6 5 "
23	5:14	6:45	5:38	6:25	5:53	5:56	6:9	5:23	
24	5:15	6:45	5:38	6:24	5:54	5:55	6:9	5:23	
25	5:16	6:45	5:39	6:23	5:54	5:54	6:10	5:22	The Moon will be at Perigee on 10th, Apogee on 23rd.
26	5:16	6:44	5:39	6:22	5:55	5:52	6:10	5:21	
27	5:17	6:44	5:40	6:21	5:55	5:51	6:11	5:20	
28	5:18	6:43	5:40	6:20	5:56	5:50	6:11	5:19	
29	5:19	6:43	...	...	5:57	5:49	6:12	5:18
30	5:19	6:42	...	...	5:57	5:48	6:12	5:18
31	5:20	6:42	5:58	5:47	

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset may be roughly arrived at by adding 17 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

For the sunrise and sunset at Rockhampton, Townsville, Cairns, and other places in Queensland, readers may be referred to the "Queenslander" to which newspaper monthly astronomical notes will be supplied.—D.E.

QUEENSLAND AGRICULTURAL JOURNAL

VOL. IX.

MAY, 1918.

PART 5.

Agriculture.

MOLASSES AS A MANURE FOR CANE CROPS.

While on a recent visit to Mackay, the General Superintendent of Sugar Experiment Stations was afforded the opportunity of inspecting one of the most up-to-date cane farms in the district—that of Mr. W. Jackson, of North Eton. For many years past Mr. Jackson has been an ardent enthusiast in the use of sugar-mill refuse such as filter-press cake, wood ashes, and molasses, and the results obtained by him amply justify their employment. Any farmer living close to a mill would be well advised in carting away mill refuse and applying it to the land, as the cost of cartage in such cases is not prohibitive. Molasses is applied by Mr. Jackson at the rate of nearly 3,000 gallons per acre direct to the young cane and also to the ratoons over the trash. The results obtained by him are certainly surprising, the cane being of a rich green colour and far more vigorous and healthy and higher than that which received no molasses. A 200-gallon iron tank on a dray is used for distributing, and the work is cheaply and quickly done. At the same time it is well to remember that failures have occurred in some instances where the direct application of molasses has been made, and it is generally preferred to treat the soil with this substance about six months before it is proposed to plant cane. Mr. Jackson's success is no doubt due to the high ratio of lime in his soil, and a good lime content can be maintained by applying several loads of filter-press refuse. Unfortunately for growers this article is now fast disappearing from our mills, due to new processes eliminating the filter-presses. Lime, however, should be supplied in cheaper forms than it is at present for agricultural purposes, and if this could be done a large demand for same would be made.

QUEENSLAND STATE PRODUCE AGENCY.

Realising that primary production is the mainstay of all new countries, that agriculture is not only a prime factor in development but is at the present time vital to national safety, the Government, determined to do everything possible for the man on the land, has decided to establish an Agency for the sale and distribution of his produce without the intervention of a third party.

For long the farmer has aimed at this and attained some degree of success with butter, cheese, and sugar, but has been unable to overcome the difficulties of establishing closer relations with the consumer for all his other produce, and the State Government will endeavour, on behalf of the producer and consumer alike, to eliminate the middleman's profits; and, in order that this may be brought about, an agency is now established, entitled "The State Produce Agency of Queensland," with State, interstate, and oversea activities, prepared in a few weeks' time (which will be duly advertised in the daily papers) to handle, in any quantity, consignments of cereals, grain, vegetables, potatoes, fruit, hay, chaff, poultry, eggs, bran and pollard, dairy produce, honey, &c., as agent for the producer or owner thereof.

Where an opening is presented, this agency will market in the other States of the Commonwealth and oversea.

The Act establishing it specifically limits commission charges to what is fair and reasonable, abolishing exorbitant profits.

This ensures to the farmer the full value of the produce of his farm.

You will be entitled to see when, where, and to whom your consignment went, and what it realised; and you will receive a prompt, clear, clean account of sales. Your produce will be handled by experts (not novices); consequently, your consignment will realise full value, and you stand no risk of being unable to collect its proceeds, payment being assured and guaranteed by the Government.

This Agency cannot make a profit for anyone but the consignor, so it is really your business—a farmer's co-operative effort in scientific distribution, State-organised. It is a necessary complement to your farm to which good selling is essential, equal in importance to good planting and good harvesting. It will market the produce for you independent of the system which enables outsiders to make more profit out of your farm than you do yourself.

It will secure for you the best returns possible, and also a true and open market for your produce—one not to be deflated or inflated at the will of interested manipulators and operators. No consignment on any account will be taken over and used by this Agency for the purpose of making a general profit. Its one aim and object is to serve, realise, and give satisfaction to each individual consignor.

You are invited to at once open up communication with this Agency. Every possible information on the above subjects will be afforded you, and your correspondence appreciated and promptly attended to, and the records of your transactions with the Agency at all times open to your inspection; and the inclusion of your name as a foundation consignor is sought and will be valued.

WM. E. HOWES, Manager.

THE TREATMENT OF DAMAGED GRAIN.

The serious plague of mice which occurred last season in New South Wales, Victoria, and South Australia resulted in considerable damage to the wheat stored at inland centres. Whilst a certain proportion of the wheat was devoured by the rodents, a considerable quantity was damaged or tainted. Some stored wheat was also damaged owing to rain and the attacks of weevils. The treatment of damaged grain was also dealt with by the Executive Committee as follows:—

The problem arose as to the best method for treating such damaged grain to prevent further deterioration, and, if possible, to purify it so that it could be utilised for food purposes. In July, 1917, the Executive Committee of the Commonwealth Advisory Council of Science and Industry had an interview with Mr. A. O. Barrett, who has had considerable experience with grain in bag stacks, and he outlined a scheme whereby wheat should be stored in special silos after mixing with quicklime. He claimed that this lime treatment has the following advantages:—

1. It dries ordinary f.a.q. wheat, thus rendering it less liable to attacks of weevils, and at the same time improving its milling qualities.
2. It destroys the smell of mouse-tainted or smutty wheat, and sterilises the outside of the grain.
3. It removes the smell of damp, musty wheat and arrests further deterioration by fungus pests.
4. It inhibits the growth of weevils in wheat already infested and prevents them from developing.

These statements were supported by the exhibition of samples of damaged wheat which had been purified in the manner indicated, on a laboratory scale.

The Executive Committee thereupon appointed Professor D. Orme Masson, F.R.S., Professor of Chemistry; Dr. W. Heber Green, Lecturer in Agricultural Chemistry; and Dr. W. J. Bull, Lecturer in Bacteriology in the University of Melbourne, together with Professor T. R. Lyle, F.R.S., to carry out tests of the effects of quicklime on damaged grain on a larger scale, and gratefully accepted Mr. Barrett's offer to allow experiments to be undertaken at the firm's maltings at Richmond. The report on these experiments forms the main part of Bulletin No. 5, recently issued by the Advisory Council of Science and Industry.

Various samples of wheat (including (1) good, (2) weevily, (3) tainted, (4) damp and damaged, and (5) mousey) were treated first by passing each lot through a small-sized Eureka wheat-cleaning machine. The cleaned wheat was then weighed and mixed with 1 per cent. of its weight of quicklime, and then stored for about fourteen days. The good wheat f.a.q. (Federation type) parted with a considerable amount of moisture, and the general effect was that the addition of quicklime to sound grain is in no way harmful, and may be expected to produce some slight improvement. All weevils in the adult stage and practically all grain attacked were removed upon screening the weevily wheat, but the weevils were not killed; it is only by adding lime at a high temperature under the conditions of Mr. Barrett's scheme that this is effected. The tainted wheat lost nearly 20 per cent. upon being screened, and the pronounced mousey and musty odour was considerably reduced, but before the work of the lime could be completed it would require to be applied fresh and hot and left in contact for some months. The damp wheat, although not so bad as the previous wheat, was yet incapable of being converted into a wholesome article, though the lime had materially reduced the smell and bacteria present. The mousey wheat was treated with freshly ignited lime, and the results proved very satisfactory, showing conclusively that the lime, to be effective, must be applied hot. The bacteriological and chemical examinations made of the lime-treated wheat clearly indicate that considerable improvement has been effected.

The bulletin, which gives full details of these experiments, may be obtained post-free from the Secretary of the Advisory Council, 314 Albert street, East Melbourne.

COST OF COTTON-GROWING PER ACRE IN TEXAS, U.S.A.

As the cost of producing cotton will no doubt be frequently inquired about during the next month or two, we ("Commerce and Finance") take occasion here to refer to some figures adduced by W. B. Yeary, Assistant Director of the Bureau of Markets of the State Department of Agriculture at Austin, Texas. In a long discussion of the subject, published in a Houston paper, he gives the following

statement of the per acre cost of cultivating 1,080 acres of land on the Taft Ranch in 1912, when the yield was 300 lb. of lint cotton per acre:—

	Per Acre. Dollars.
Labour for cultivation, picking, ginning, &c.	12.87
Feed for mules, in addition to that grown on the farm	4.15
Supplies and repairs . . . . .	.68
Poison . . . . .	.74
Fertiliser (on small portion as experiment) . . . . .	.15
Depreciation on stock and equipment	1.90
Seed for planting . . . . .	.20
Overhead expenses, taxes, supervision, &c.	1.50
Total	22.19

These figures represent the cost of producing 300 lb. of lint cotton and 600 lb. of seed (900 lb. of seed cotton). Assuming that the seed sold for 20 dollars per ton, or 6 dollars, the cost of producing 300 lb. of lint cotton would have been 16.19 dollars, or 5.40 cents per lb. As the cost of ginning and the interest on the value of the land is not included, it may perhaps be proper to add an allowance of 1 cent per lb. to cover these items, which would bring the total cost of producing lint cotton on the Taft Ranch in the year 1912 to 6.40 cents per lb. It is true that a yield of 300 lb. per acre is exceptional.

In 1912 the average production was 200 lb. per acre, and the Taft Ranch figures (plus 1 cent per lb. for ginning, interest and incidentals) applied to the whole area would indicate an average cost of 10.09 cents per lb.

The average advance in the price of all commodities other than cotton since 1912 has been about 80 per cent. On this basis the present cost of producing cotton as expressed in terms of other commodities was about 18 cents per lb.

That this figure is somewhere near the equitable value of cotton under present conditions is the conclusion to which most economists are coming. It may prove to be considerably above its market value if spinners' takings and exports continue to decrease at the present rate.

THE ETTERSBURG STRAWBERRY.

During the late strawberry season, a specimen of a strawberry was brought to this office, the fruit of which was produced on a tall stem. This was called by the grower, a "tree" strawberry. In the April issue of "Garden and Field," Adelaide, S.A., an apparently similar strawberry is described as the "Ettersburg." The information was derived from the Victorian Department of Agriculture, and is as follows:—

This is the so-called "tree" strawberry that was freely advertised last season, and sold at 1s. per plant. It is certainly not a "tree" strawberry—that name is quite a misnomer, and the term "bush" strawberry would certainly have been a better one.

The foliage has grown very vigorously, the leaves are strong, and altogether it may be described as an exceedingly robust and vigorous grower. The "tree" habit which has been ascribed to the plant occurs in the form of strong, rather long and upright flowering stems, which throw the flowers far above the foliage, and taller than any other strawberry so far grown here. Both the main stalk and the individual stems are long, and the flowers are usually well developed.

The first crop of fruit was not generally good, the second being heavier. The berries of the earlier crop were the larger. But neither the early nor the late crop produced berries of large dessert size, although the plants were grown under favourable conditions. The second crop quantity was good, the berries were well coloured, firm, and very well flavoured. So that, judging from the first season's results, it would seem that the Ettersburg strawberry suited the requirements as a jam factory berry, being sweet, solid, and prolific. But it has not proved itself worthy of being placed on the list of strawberries grown for dessert or table. It would be well if the term "tree" were abandoned in favour of a more descriptive name.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The following revised list of breeders of purebred cattle is published for the purpose of informing those who desire to improve their stock where the best cattle can be obtained in the State. The Department of Agriculture and Stock takes no responsibility in relation to the entries in the list; but, when inquiries were first made, the condition was imposed that the entries were to be only of stock that had been duly registered, or that were eligible for registration in the different herd books. The entries received were, in some cases, somewhat too confusing for proper discrimination, it has, therefore, now been decided that only such cattle as have been registered will be included. The lists previously published in the *Queensland Agricultural Journal* have now been withdrawn for revision.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
F. C. G. Gratton ..	"Towleston," Kingsthorpe	2	14	Holstein Cattle Club Herd Book
T. Mullen	"Norwood," Chelmer	3	20	Queensland Jersey Herd Book
J. H. Paten	Yandina	6	21	Ayrshire Herd Book of Queensland
Queensland Agricultural College	Gatton	4	38	Ayrshire Herd Book of Queensland
		2	2	Ayrshire Herd Book of Scotland
		2	9	Holstein-Friesian Herd Book of Australia
		2	31	Jersey Herd Book of Queensland
J. W. Paten	Wanora, Ipswich ..	10	42	Ayrshire Herd Book of Queensland
M. W. Doyle	Moggill	4	12	Queensland Jersey Herd Book
G. A. Buss	Bundaberg	1	15	Herd Book of the Jersey Cattle Society of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Milking Shorthorn Herd Book of Queensland
M. F. and R. C. Ramsay	Talgai, Clifton ..	5	27	Herd Book of the Jersey Cattle Society of Queensland
George Newman ..	Wyreema	12	47	Holstein-Friesian Herd Book of Australia
R. Conochie	Brooklands, Tingoor	9	21	Queensland Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
W. J. Barnes	Cedar Grove ..	10	37	Queensland Jersey Herd Book
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
W. J. Affleck	Grasmere, N. Pine ..	6	31	Queensland Jersey Herd Book
A. J. McConnel	Dugandan, Boonah	19	36	Australian Hereford Herd Book
A. Pickels	Blackland's Stud Farm, Wondai	4	62	Illawarra Dairy Cattle Herd Book of Queensland
G. C. Clark	East Talgai, Ellinthorpe	3	7	New Zealand Herd Book
H. D. B. Cox	Sydney (entered brother's name)	3	16	Commonwealth Standard Jersey Herd Book
J. T. Perrett and Son	Coolabunia	2	36	Illawarra Herd Book of Queensland
State Farm	Kairi	4	8	Ayrshire Herd Book of Queensland
		1	2	Holstein-Friesian Herd Book of Australia
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Australian Hereford Herd Book
W. T. Savage	Ramsay	2	22	Illawarra Herd Book of Queensland
Tindal and Son	Gunyan, Inglewood	50	400	Australian Hereford Herd Book
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Queensland Jersey Herd Book
J. H. Fairfax	Marinya, Cambooya (2)	9	55	Ayrshire Herd Book of Queensland
C. E. McDougall	Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
J. Holmes	"Longlands," Pittsworth	6	20	Ayrshire Herd Book of Queensland
P. Biddles	Home Park, Netherby	1	20	Illawarra Dairy Cattle Association
A. Rodgers	Torran's Vale, Lane-field	1	9	Milking Shorthorn Herd Book
R. S. Alexander	Glenlomond Farm, Coolumboola	1	..	Holstein-Friesian Herd Book of Queensland
		2	..	Holstein-Friesian Herd Book of Australia
State Farm	Warren	3	83	Ayrshire Herd Book of Queensland
S. H. Hosking	Toogooloowah ..	2	15	Holstein Cattle Club Herd Book
W. J. H. Austin	Hadleigh Jersey Herd, Boonah	2	11	Queensland Jersey Herd Book
Ditto	ditto .. ..	..	6	Commonwealth Standard Herd Book
H. M. Hart	Glen Heath Stud, Yalangur	7	21	Ayrshire Herd Book of Queensland
C. Behrendorff	Inavale Stud Farm, Boonah	3	9	Holstein-Friesian Herd Book of Queensland
F. A. Stimpson	Ayrshire Stud Farm, Fairfield, South Brisbane	25	77	Ayrshire Herd Book of Queensland
M. L. Cochrane	Paringa Farm, near Cairns	5	21	Ayrshire Herd Book of Australia

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
Albert Cook	"Greenmount," Mackay	1	8	A.-A. Stud Book, New Zealand
Thomas Brown	"Bellgrove," Kingaroy	1	14	Do.
Higgins Bros.	Sandy Creek, Leslie, Q.	6	2	Do.
Calcino Bros.	"Summariva," Charleville	3	4	Do.
W. M. McKelvie	"Undulla," Miles ..	5	4	Do.
James Connors	"Glen Erin," Nanango	1	2	Do.
J. A. Mackintosh ..	"Yundah," Warwick	2	8	Do.
M. J. Luff	Kaimkillenbun ..	1	1	Do.
A. Spencer	Brisbane	2	1	Do.
Beak Pastoral Co. ..	Rockhampton ..	2	10	Do.
W. Jackson	Central Farm, Savannah, Mackay	1	1	Do.
E. Swayne, M.L.A. ..	West Plane Creek ..	1	2	Holstein-Friesian Herd Book of Queensland
Godfrey Morgan	"Arubial," Condamine	3	6	Queensland Shorthorn Herd Book
John Anderson	"Fairview," Southbrook	7	34	Ayrshire Herd Book of Queensland
James Strong	"Woodlands," Gatton	6	23	Queensland Jersey Herd Book

TICK RESISTANT CATTLE.

By DR. T. HARVEY JOHNSTON and Miss M. J. BANCROFT, B.Sc., Biology Department, University, Brisbane.

The subject of tick resistance of cattle has, in this State during the past few years, been associated with the name of Mr. Munro Hull, of Eumundi, on the North Coast Railway Line, and is at present being investigated by us.

The vital importance of the tick problem (as distinct from the subject of "tick fever" or "redwater") is brought home to every cattleman by the depreciation in value of an animal caused by "tick worry" and the trouble and expense incurred in the erection and maintenance of dips. The established fact that Mr. Munro Hull has had now for several years a large number of animals, which have become tick-resistant and have remained practically free from ticks, though running in ticky paddocks where control animals become heavily infested, and that these resistant cattle are never dipped or sprayed or treated in any way for ticks, alone warrants some attention being paid to the subject and to the possibilities of spreading the peculiarity.

In view of the fact that one or more tick-resistant animals occur in very many herds and the utter impossibility of examining more than a small fraction of the total number, all who are interested in the subject are invited to send to either of the abovenamed any observations they have made, or may make, which may help in the solution of the problem. It is felt that the experience and opinions of the many observant dairy farmers and cattle-raisers throughout the State would be extremely valuable.

Correspondents are particularly asked to note that the investigators are not at present concerned with the subject of "cattle-tick fever." It is hardly necessary to state that only facts are desired, uncertain statements being devoid of scientific value.

Authentic observations under the following headings as regards tick-resistant animals would be useful:—

1. Are these animals more usually of any particular breed?
2. The length and texture of the hair.
3. The colour, texture, and oiliness of the skin.
4. The general condition and stamina of the beasts.
5. The length of time the animals have been resistant. Have they possessed the resistance from birth, or have they acquired the peculiarity later in life?
6. The transmission of this resistance to progeny.
7. The nature of the country on which the animals are running.
8. Influence (if any) of food.
9. The effect (if any) of dipping upon such resistant animals.
10. Whether the exudate described below has ever been noticed on these cattle.

EXUDATE FOUND ON CERTAIN TICK-RESISTANT COWS.

This exudate or so-called serum has on many occasions been referred to by Mr. Munro Hull, who was, as far as we know, the first to bring it under public notice in Australia.

It consists of drops of a clear yellow fluid which appear on the skin on various parts of the body, notably on the escutcheon, where it is more evident owing to the shortness of the hair. These drops become thick and sticky, ultimately forming little granular masses or thin flat yellow scabs, according to the size of the original drop. These are readily flaked off, leaving a patch of clean, smooth skin below. Blood is sometimes present, in which case the resultant scab is discoloured. There is no evidence that each patch of exudate is caused by the bite of the tick. Very occasionally larval ticks have been found attached to a dry scab, owing, no doubt, to their having become entangled in the sticky fluid. The affected area is irritable, the cows showing a great desire to lick or rub the part. The condition is apparently more or less dependent on the weather, being more usually seen on a hot, muggy day.

There are certain conditions which may be confused with this exudation, *e.g.*, "tick sores." The only kind of tick sore which is likely to be mistaken for it is that in which the scab appears as a dark blood-stained centre to which a tick is often seen attached, surrounded by a ring of clear, yellow material. Beneath the discoloured centre is a little plug of blood and pus, while, when the scab is removed, a corresponding pit is seen in the skin.

The presence of a depression (often pus-filled) beneath the scab distinguishes a tick sore from the scab formed from the "serous" exudate. The presence of a tick or a depression where the mouth parts of a tick have been inserted is also a marked difference.

Thick whitish scurfy scabs occur especially at the butt of the tail and in the ears of some animals, but no cattle-owner is likely to confuse these with any of the conditions abovementioned.

MEASURING LOG TIMBER.

There are five systems of measurement in use for the purpose of ascertaining the cubic and superficial content of log timber in various countries, known as the "Die Square," "Calliope Measure," "True Contents," "Board Measure," and "Quarter Girth." The latter system—"Quarter Girth"—is that in use in British countries, and is generally approved, as it distributes the waste between the vendor and the purchaser. The Rule is:—

Multiply the length of the log in feet by the square of the quarter of the girth in inches in the centre of the log, and divide by 144, which gives the cubic contents in feet, or multiply this by 12 and the superficial feet area is obtained at 1 inch thick.

TO OBTAIN THE APPROXIMATE YIELD OF 1-INCH BOARDING IN A LOG.

Divide the mean girth in inches by 5 for the number of equivalent boards (*b*); multiply the result by the length (*l*) multiplied into the diameter (in feet to the nearest decimal) (*d*) for the yield in superficial feet (*f*). An example may be given thus—

Mean girth of log, 80 inches; length of log, 30 feet.

Then, $b \times l \times d = f = \frac{80}{5} \times 30 \times 2.1 = 1,008$ feet.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 26TH FEBRUARY TO 29TH MARCH, 1918.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Margaret ...	Ayrshire ...	28 Dec., 1917	742	4.5	39.52	
Mistress Bee ...	Jersey ...	23 Jan., 1918	681	4.6	36.90	
Lady Spec... ..	Ayrshire ...	19 Feb. "	884	3.4	34.88	
Sweet Meadows ...	Jersey ...	8 Aug., 1917	444	6.6	34.75	
Miss Edith... ..	" ...	23 Dec. "	658	4.1	31.68	
Burlesque	" ...	27 Mar. "	381	7.0	31.65	
Leading Lady ...	" ...	26 Dec. "	579	4.6	31.37	
Belinda	Ayrshire ...	14 Jan., 1918	767	3.5	31.37	
Miss Bell	Jersey ...	27 June, 1917	489	5.4	31.19	
Miss Edition ...	" ...	12 Nov. "	588	4.4	30.45	
Jeannie	Ayrshire ...	13 Dec. "	716	3.6	30.18	
Hedge's Nattie ...	Holstein ...	1 Feb., 1918	730	3.5	29.84	
Netherton Belle ...	Ayrshire ...	17 July, 1917	487	5.0	28.73	
Violette's Peer's Girl	Jersey ...	27 June "	470	5.0	27.73	
College Ma Petite	" ...	19 Nov. "	470	5.0	27.73	
College Cold Iron	" ...	7 Dec. "	478	4.8	27.05	
Lady Dorset	Ayrshire ...	14 Aug. "	516	4.2	25.47	
Thornton Fairetta	Jersey ...	30 June "	315	6.8	25.41	
Hedge's Dutchmaid	Holstein ...	7 Sept. "	597	3.6	25.19	
Comedienne	Jersey ...	13 Dec. "	426	5.0	25.13	
College Mermaid ...	" ...	21 Aug. "	424	5.0	25.01	
Miss Betty	" ...	27 Mar. "	319	6.6	24.81	
Songstress	Ayrshire ...	1 Oct. "	448	4.4	24.20	
Hedge's Madge ...	Holstein ...	23 Mar. "	442	4.6	23.94	
College Damsel ...	" ...	12 July "	674	4.2	23.41	
Lilia	Ayrshire ...	11 July "	471	4.2	23.23	
Iron Plate	Jersey ...	28 June "	671	4.2	23.11	
Lady Annette	Ayrshire ...	19 Oct. "	425	4.6	23.03	
College St. Margaret	Jersey ...	9 Nov. "	461	4.2	22.74	
Prim	Holstein ...	3 Aug. "	552	3.4	21.92	
Skylark	Ayrshire ...	24 May "	409	5.2	21.18	
La Hurette Hope	Jersey ...	22 Aug. "	377	4.7	20.87	
College Bluebell ...	" ...	28 June "	391	4.3	20.65	
Netherhall Queen	Ayrshire ...	30 June "	476	3.7	20.63	
Kate						
Charity	Jersey ...	26 June "	267	6.4	20.24	

INBREEDING OF DAIRY CATTLE.

It cannot be too prominently kept before dairymen that the only available way to increase the production from their cows is to grade up from what they possess with a purebred dairy bull from a herd with no doubtful blood in it, and it is a well-known fact that we have many such herds in this State. We have dairy bulls to choose from that have Australian records behind them for fifty years, and British another fifty years behind that, and whose offspring at two years old have been going begging for some years before the war for buyers at £10 to £12 per head, finding only few purchasers. And a two-year-old bull will last a farmer ten years, because the surest way of improvement is to use the same bull on his own progeny for as long as he lives. Out-breeding has been the curse of cattle-breeding for the dairy in some States all along. Mr. McNab, Tasmania, in 1900, mentioned a small dairy herd of twelve cows bred up from Shorthorn dams with an Ayrshire bull, a really grand lot, which were being put to an Alderney at the time of his visit; and had the owner started with an Alderney he would probably have had as good a lot; but the case shows the manner in which stock gets mongrelled up by out-breeding. The two herds specially noted by Mr. McNab as being desirably graded up were already in a fair way to being obliterated, as far as uniformity of type goes.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, MARCH, 1918.

The fourteenth egg-laying competition held at the College was brought to a close on 31st March. In order to complete the full year (the competition commenced on 3rd April, 1917), the birds owned by Messrs. E. Chester and R. Burns were kept in the pens until the evening of 2nd April, with the result that the former pen increased its score by 9 eggs, making a grand total for the 365 days of 1,661. Mr. Burns's bird laid one more egg, making her total for the full year 335. A full report on the whole competition will be issued later. The following are the individual records:—

Competitors.	Breed.	March.	Total.
LIGHT BREEDS.			
E. Chester	White Leghorns	138	1,652
G. Chester	Do.	78	1,366
W. Becker... ..	Do.	107	1,366
*G. H. Turner	Do.	99	1,366
*J. M. Manson	Do.	104	1,348
W. R. Crust	Do.	79	1,343
Oaklands Poultry Farm	Do.	73	1,343
T. Taylor	Do.	108	1,316
F. W. Leney	Do.	67	1,304
D. Fulton	Do.	103	1,301
Kelvin Poultry Farm	Do.	78	1,295
*J. R. Wilson	Do.	112	1,277
*A. T. Coomber	Do.	79	1,258
Chris. Porter	Do.	102	1,251
T. A. Pettigrove, Victoria	Do.	84	1,246
*J. Zahl	Do.	88	1,231
Moritz Bros., S.A.	Do.	75	1,207
J. G. Richter	Do.	58	1,186
T. B. Hawkins	Do.	77	1,180
*Dixie Egg Plant	Do.	107	1,178
C. Knoblauch	Do.	91	1,178
Mrs. S. J. Sear	Do.	96	1,164
*Mrs. J. R. D. Munro	Do.	63	1,164
Quinn's Post Poultry Farm	Do.	53	1,164
Mrs. W. D. Bradburne, N.S.W.	Do.	69	1,157
C. H. Singer	Do.	106	1,156
J. L. Newton	Do.	66	1,154
A. Shillig	Do.	66	1,142
J. Holmes	Do.	67	1,132
L. G. Innes	Do.	87	1,130
A. H. Padman, S.A.	Do.	54	1,124
*A. W. Bailey	Do.	75	1,121
Mars Poultry Farm	Do.	49	1,093
C. P. Buchanan	Do.	62	1,081
S. C. Chapman	Brown Leghorns...	59	1,079
F. Clayton, N.S.W.	White Leghorns...	57	1,079
E. Cross	Do.	48	1,076
*T. Fanning	Do.	75	1,074
G. J. White	Do.	37	1,074
E. A. Smith	Do.	73	1,069
Miss M. Hinze	Do.	75	1,062
J. Ferguson	Do.	74	1,059

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	March.	Total.
LIGHT BREEDS— <i>continued.</i>			
R. Holmes	White Leghorns ...	77	1,054
G. Howard	Do.	78	1,046
Mrs. J. Carruthers	Do.	79	1,034
Geo. Williams	Do.	46	1,028
*A. E. Walters	Do.	48	1,004
*Dr. E. C. Jennings	Do.	62	997
*C. C. Dennis	Do.	0	822
HEAVY BREEDS.			
*R. Burns	Black Orpingtons ...	120	1,470
*Mars Poultry Farm	Do.	120	1,428
W. Smith	Do.	99	1,303
A. E. Walters	Do.	90	1,277
*E. F. Dennis	Do.	74	1,217
W. P. Hanson, N.S.W.	Do.	65	1,183
P. C. McDonnell, N.S.W.	Do.	58	1,173
*E. A. Smith	Do.	95	1,168
F. A. Claussen	Rhode Island Reds ...	61	1,161
D. Kenway, N.S.W.	Black Orpingtons ...	98	1,138
Mrs. J. H. Jobling, N.S.W.	Do.	39	1,130
H. Jobling, N.S.W.	Do.	70	1,104
C. B. Bertelsmeier, S.A.	Do.	94	1,082
Cowan Bros., N.S.W.	Do.	79	1,073
King and Watson, N.S.W.	Do.	81	1,063
J. M. Manson	Do.	90	1,021
*Oaklands Poultry Farm	Do.	42	1,001
R. Burns	S. L. Wyandottes ...	63	1,001
*Miss M. Hinze	Black Orpingtons ...	30	987
E. Morris	Do.	86	976
C. C. Dennis	White Wyandottes ...	88	975
*Kelvin Poultry Farm	Plymouth Rocks ...	48	934
*F. W. Leney	Rhode Island Reds ...	30	778
F. Clayton, N.S.W.	Do.	42	769
Totals ... ..	...	5,488	83,968

* Indicates that the birds are engaged in single hen test.

DETAILS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
G. H. Turner	178	210	248	262	221	247	1,366
J. M. Manson	229	243	186	178	240	272	1,348
J. B. Wilson	229	203	193	219	209	224	1,277
A. T. Coomber	206	160	250	237	205	200	1,258
J. Zahl	243	110	247	149	247	235	1,231
Dixie Egg Plant	195	217	178	239	127	222	1,178
Mrs. J. R. D. Munro	264	197	144	153	162	244	1,164
A. W. Bailey	36	213	229	227	227	189	1,121
T. Fanning	157	209	187	146	157	218	1,074
A. E. Walters	120	130	182	222	176	174	1,004
Dr. Jennings	129	118	207	189	220	134	997
C. C. Dennis	176	89	77	154	162	164	822

EGG-LAYING COMPETITION—continued.
DETAILS OF SINGLE HEN PENS—continued.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
HEAVY BREEDS.							
R. Burns	204	195	267	193	277	334	1,470
Mars Poultry Farm	220	255	232	234	249	238	1,428
E. F. Dennis	233	231	201	277	239	36	1,217
E. A. Smith	193	201	171	218	196	187	1,166
Oaklands Poultry Farm... ..	220	136	144	124	233	144	1,001
Miss M. Hinze	161	136	130	181	185	194	987
Kelvin Poultry Farm	137	143	160	211	106	177	934
F. W. Leney	133	165	118	115	114	133	778

NON-PRODUCTIVE HENS.

Mr. R. T. G. Carey, of Pindora Poultry Farm, Beerwah, whose article on trap-nests for poultry appeared in the March issue of this Journal, sends us a further instructive paper on unproductive hens, which will probably be of interest to those of our readers who are entering on the poultry industry. Mr. Carey writes:—

“One of the essential points in poultry farming not to be overlooked, is that relating to the hen which does not lay eggs. The expense incurred for the keep of such hens, and the room that they occupy upon the perch, afford no corresponding remuneration. Hence, should there be ten such ladies in a flock, each eats from 3½ to 4 oz. of feed daily, and in a week those hens would devour 17 lb. 2 oz. of food, and a month's supply would amount to 68 lb. 8 oz. of feed. That cost incurred, with present-day prices, shows how expensive it is to stock such hens. With bran and pollard at 1s. 8d. per bushel, wheat 5s. 3d. per bushel, and maize 5s. per bushel, which is approximately their respective value at the time of writing, the 68 lb. 8 oz. of feed would cost 7s. 6d. per month, or £4 4s. for a year's maintenance. What a foolish idea it is, then, to keep such unprofitable hens, thus courting failure quickly. But that is not all. We have not estimated the daily visits to the yards for eggs that were not there, the labour of carrying water for drink, the cleaning up of manure and other refuse, which make them a source of tremendous expenditure and swamps up all the profits of the productive fowls. The elimination of non-productive hens helps to minimise the expense, and prompt culling reduces the grain bill from 20 to 25 per cent., without affecting the egg yield, thus revealing that the non-laying hen is absolutely worthless and that to sell her at market value is the best course. One naturally asks: How can you tell a non-productive hen among a flock of fowls when all look alike? The daily visits and your careful observance of each individual bird becomes part of your instinct, enabling you to note at a glance many points, such as faulty shape of the face, crow-face, ugly or unnatural comb and wattles, wrong-coloured eyes, under-projection of beak, wry tail, hunch back, bow legs, five toes where there should be only four, or *vice versa*, and a host of other defects, which denote points for culling and the lessons to study.

“The visible signs which indicate the non-productive hen are easily recognised. Upon every fowl of the lighter breeds, the pigmentation upon the legs, beak, vent, and hide shows up strongly at an early age, but when the laying season is fully on, all that colouration disappears and a bluish hue appears; the bird's feathers are ragged and tail and wing feathers become bare, resembling points of wire, while she is lean and extremely active. This is the layer. Should a number of fowls appear to have bright-yellow colouration upon their legs, beak, and earlobes when the laying

season is at its height, and their feathers neat and clean, body plump, very particular about her food, that is her ladyship, the non-productive hen, and that is the ocular test as you walk through the flock.

“The scientific test is made by placing three or four fingers between the pin bones near the vent; should there not be sufficient space to admit of the three fingers, then the passage is too small, hence the small egg; but should there be great depth with good width at the business end of a hen, and the feathers fluffy, while the abdomen is pliable, that is the large egg-layer. Again, the length of back is also a good sign of a productive layer. Show birds are picked upon points of attractiveness, their laying abilities not being studied.

“Professor Kirkpatrick, of the Connecticut Agricultural College Poultry Department, U.S.A., reports on the results of culling of flocks: ‘Every flock, small or large, should be rigidly examined and deeply culled, so as to gain profits from all the productive fowls and save the waste entailed by the upkeep of the non-productive hen.’ That statement and the action of deeply culling form the base of all profitable poultry farming. If the latter be performed, then there would be no lack of egg production, and the financial success of every individual owner of flocks of hens and pullets would be assured.

“Surely, with the laying capabilities of our Australian hens, and the ideal climatic conditions, in an ideal country, to enlarge the capacity of our poultry plants, and with such a ready market at hand, to get rid of unpromising poultry, nothing but the very best of stock should remain. But that is not all. Amongst all the latest inventions for incubation the newest, a ‘Cabinette Mammoth,’ of 2,400-egg capacity, occupying a space of only 5 square feet, with electric fan chambers, no cooling, and a host of other labour-saving devices, indicates how easily the broods can be hatched out. Then the giant colony brooders for 500 to 1,000 chicks to foster-mother them has relieved mankind of a huge amount of worry, time, and labour, and hurries on the breeding with amazingly light work, so that the whole of the old slow-hatching methods of our foreparents has been completely modernised to a branch of science, and the whole outcome of chicken-raising has been brought down to a limitation of months, and even to days, instead of years. Hence the study and careful examination of the embryo of the fertile and unfertile eggs, deformity, weaklings, and other defects well known to breeders has taught them to begin at the early stage to sort out the undesirable; and as age creeps on over the great hatches, and maturity approaches, the sickle of culling must be carried into effect. Then, what is the result? A perfect-looking flock and one of promise; and one says: ‘Ah, well done; I’m right now; all’s well.’ But no; we have not finished yet. Now comes the laying period, and here is another problem confronting us. That pullet ought to lay but does not. Those pullets of fine carriage, splendid plumage, delicate and ladylike are the particular ones for observation, and require an excursion trip to some profitable market, and so ends her career—space, feed, labour, all saved, and still room left for the worker.

“The United States Government estimates that, since the war, the herds of Europe have been reduced by 115,000,000 meat animals—i.e., 28,000,000 cattle, 54,000,000 sheep, and 32,000,000 hogs—the reduction still being advanced each day. Therefore, with such a huge decrease of meat-producing stock, what a great opportunity awaits poultry-breeders to hatch in big quantities. Poultry is the shortest, quickest, and most profitable source of increase in a limited period of half-yearly instalments of a nutritious food. It therefore behoves Australian poultry-breeders to raise the quantity (for the demand is sure to flow in our direction) to meet that great meat shortage. This is where the great culling gains, and reward for the produce becomes remunerative, the non-productive hens add to the cockerels’ quota, and farmers have got the egg-supplying and prolific breeding stock left for good purposes. When the war terminates, those stricken areas must have stud stock to rebuild up their poultry-yards, and Australian breeders should be prepared to meet the demand, as the expansion of the poultry industry is looming ahead, and it is the productive fowls that will build up this noble enterprise and not the non-productive hen.”

Viticulture.

HINTS TO GRAPEGROWERS.

By C. A. GATTINO.

MANURING.

Although the virgin soils of this country do not need any, or at least very little, manuring for several years after being planted, there comes a time when it is required, so that the vine will give a plentiful crop.

The yearly production of grapes and new wood take away each year considerable quantities of matters which form the fertility of the soil. Therefore, to continue and improve such production, we must give back to the soil, under artificial form, the fertile substances given by nature. The substances which generally need replacing are potash (phosphoric acid), nitrogen, and organic matter.

A good, cheap manure may be obtained by digging in all leaves, grapes residues, green-fodder crops, &c.; the town's sweepings and a little stable-yard manure are also good fertilisers for vines. Generally the manures are applied by turning in with the plough or the hoe as soon as they are spread. For soils poor of lime it is a good practice to spread lime at intervals of about ten years.

Hereunder are some practical rules for the manuring of the vines:—

1. For calcareous soils: Ashes, decomposed branches and leaves of the same vines, and maize stocks well chopped.
2. For pebbly soils: Turning under green lupine or trefoil, the spreading of lime, ashes, and fresh surface soil from the woods containing plenty of humus.
3. For clayey soils: First place small stones at the bottom of the holes where the vine is to be planted, and then sand, charcoal, dry vine branches, &c.; put in the soil residues of grapevine branches; also lime or ashes not containing any lye.

With this system you will loosen the soil, improve the natural drainage, and enrich it with materials required by the vine.

(TO BE CONTINUED.)

PRACTICAL HINTS IN ESTABLISHING A VINEYARD.

By P. MAHONEY.

The most practical method under which to establish a vineyard for commercial purposes, on a small or large, extensive scale, is: First and foremost to plough the land thoroughly to the depth of about 9 in. in February or March (whether virgin land or otherwise). Then harrow it level, but not fine, so as to give the light and air full access in and around the soil, to perform the duties of sweetening and liberating plant-food. Then get the square of the block, more particularly if the vines are not going to be trellised, so as to facilitate cross-cultivation. For without squaring the piece to be planted, the rows will not run straight or parallel both ways, thus debarring cross-cultivation, which is most essential for numerous reasons, viz.:—For the saving of hoe work in keeping down weeds, &c., and conserving of moisture, which is most important, and preventing the ground from becoming baked and hard between the plants during dry spells. Then after the square has been secured and pegs put in on the top and bottom of the land to the distance at which the vines are to be planted, get two steady, strong horses and a plough. Then plough four furrows 9 or 10 in. deep, two one way and two in the opposite direction, leaving no land uncut. These four furrows are to be cut in a straight line between a peg on the top and one on the bottom of the land, leaving the open furrow in a direct line between the pegs. After the whole block has been treated in this fashion—that is, only ploughed between the pegs—the subsoiler is to be brought into action. An ordinary plough, with the mould-board removed, makes a good subsoiler. Set it at as great a depth as the horses can pull it. Three horses are rightly needed on it, but two will do good work. Run it in the bottom of the open furrows (centres) in each score. Now, this being done, the land is left in that state until it rains. If a heavy rain occurs before the time comes for the filling in of the furrows, it would be advisable to run up the furrows once more with the subsoiler, since if the rain should have been heavy it would have a tendency to run the soil together again, but otherwise it is not required. To get the best results, this should be completed not later than March. Now, when these conditions have been complied with, it is necessary to let the furrows lie open until rain occurs. Then, immediately after the rain, run through each furrow with a Planet Junior cultivator (one horse), having it set just a little wider than the open furrow, so as to assist aerating and sweetening. In the case of no rain occurring for about six weeks, the cultivator should be run through the furrows in their dry state. This should be continued until about the end of June or July, when it is deemed satisfactory that the last serviceable rain has fallen before planting season has arrived. After the abovementioned rain the land will have to be ploughed back into the centre, first starting by ploughing two furrows on each row, throwing them towards each other. Do this to the whole block. This will leave two open furrows in each row, of which the subsoiler is to be run in them the same as the first one. Then two more furrows are to be thrown up as with the previous two, and also subsoiled. This having been done, the ground will be left in a mound, which can be levelled with a harrow or disc cultivator, and should be kept in good buckle for planting through the assistance of cultivator and harrows. Now the pegs on the top and bottom sides should be replaced, as probably they were disturbed. Then a line can be drawn from peg to peg with pieces of tape or cloth indicating where vines are to be planted. Later on, during the growing season, more subsoiling can be done—that is, if the growth of the vine warrants it; if not, it can be left until the following season. It is not advisable to subsoil all the land, for in a country such as this, where the rainfall is great, it would have a tendency to run together before the roots derived any advantage from the subsoiling. Undoubtedly subsoiling pays a hundredfold, for it encourages the plant to root deep and also spread without any check. Subsoiling in this way is more satisfactory than trenching or explosives, for it can be done as the plant is growing, thus encouraging the roots, without any fight in the plant's infancy, to spread and go deep, which means everything during dry spells, &c.

(TO BE CONTINUED.)

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, Government Botanist.

No. 13.

MOSSMAN RIVER GRASS (*CENCHRUS ECHINATUS*, LINN.)

Description.—An erect annual grass, 1-3 feet high, the lower parts of the stem occasionally prostrate and rooting at the nodes. Leaves rather long, flat, glabrous or scabrous-pubescent. Spikes dense, cylindrical, 1-4 inches long; the "burrs" are 3-4 lines in diameter and consist of an involucre of hardened spines connate below and forming a bristly cup at the base, and contain several (usually 2-4) spikelets.

Distribution.—Found in most tropical countries, said to be a native of tropical America; elsewhere probably naturalised. In Queensland it is represented in the Government Herbarium from the following localities:—Johnstone River (*Dr. T. L. Bancroft* and *Rev. N. Michael*), Nelson (*A. A. Girault*), Townsville (*W. Weston*), and Atherton Tableland (*C. T. White*).

I have also received specimens for identification from Fiji (hab., Lautoka, *W. Greenwood*) and New Guinea (hab., Duke of York Islands, *W. Bradtke*).

The reason that it has been passed over previously is that it has been confused with the two other Queensland species (*Cenchrus australis* and *C. clymoides*). It is probably naturalised in Queensland though it has been here for over thirty years.

We also have in our herbarium Papuan specimens collected at Boku by Mrs. H. P. Schlencker. These were recorded as Papuan, as *Pennisetum cenchroides* by F. M. Bailey (*Queensland Agricultural Journal*, Vol. 23, p. 220).

Ewart and Davies record the allied species *Cenchrus tribuloides*, as a naturalised alien in the Northern Territory.



PLATE 14.—MOSSMAN RIVER GRASS (*Cenchrus echinatus*, Linn.).

Entomology.

EXPERIMENTS IN TRAPPING THE QUEENSLAND FRUIT-FLY

(*BACTROCERA TRYONI*).

In order to definitely prove the value of certain fruit-fly lures which have recently been discovered by private persons, numerous experiments have been conducted by this Department during the past two years. These experiments have shown that the male fly can be attracted in large numbers by a lure which is apparently a sex lure, and that both male and female flies can be attracted by means of a food lure discovered by Mr. A. W. Harvey, a nurseryman of Clayfield.

In order to demonstrate the value of the latter lure thoroughly, Mr. James Mitchell, of this Department, was instructed to carry out a practical trial on the 25th of March, under strict test conditions.

Mr. Mitchell has submitted the following report:—

“I have to state that in compliance with your instructions I proceeded to Mr. A. W. Harvey’s nursery, at Clayfield, yesterday, the 25th instant. I obtained a trap from Mr. Harvey, baited with his lure, and placed the trap under a *Solanum* at 9 a.m.

“The trap was left in this place for an hour and a-half, when I removed it to the property of Mrs. Hutton, at Albion, where I placed it under another *Solanum* at 11 a.m. and kept it there till 5 p.m.

“I remained with the trap throughout the day, and do hereby guarantee that all the flies submitted herewith were attracted by the lure on the trap, and were caught and held by the trap. The weather conditions were not too favourable for the test, as the wind was gusty, and during the period of fully an hour no flies were caught on account of the smoke from a grass fire in the neighbourhood, which enveloped the trap. The greater number of flies were caught during the earlier part of the day, and after 3 p.m. During the middle of the day few flies were caught.”

This report was submitted to Mr. Henry Tryon, the Government Entomologist, who reported as follows:—

“I am in receipt of a parcel of fruit-flies referred to by Mr. Inspector James Mitchell in his communication of even date (26th March, 1918) as having been captured by him in the course of an experiment carried out yesterday, in which a trap and lure furnished by Mr. A. W. Harvey were used.

"I have now to add that it is found, on examination of the said parcel of fruit-flies, that it comprises 231 examples of *Bactrocera Tryoni*, the common fruit-fly of Queensland, and that of this number 138 are male individuals and 93 females.

"Of these female flies, eight were dissected by my assistant, in order to ascertain the condition of their ovaries; with the result that two were found to be filled with ova—one containing thirty nearly mature eggs, and the other many immature ones."

The result of the trial is therefore considered satisfactory, as it has definitely proved that both male and female Queensland fruit-flies can be attracted by the lure and caught by a specially constructed trap which has been invented and patented by Mr. A. W. Harvey.

A very interesting point is revealed by the latter portion of Mr. Tryon's report, which shows that the flies were evidently caught before they had done any damage.

This is a very important point, as each female fly is capable of laying as many as 200 eggs and, consequently, of destroying a large number of individual fruits.

THE NORIT PROCESS OF MANUFACTURING WHITE SUGAR.

The "International Sugar Journal" published, in 1915, a lecture by Dr. A. Wijuberg on "The Norit Process of Manufacturing White Sugar." In this process it is claimed that the colouring matter of the juice is removed by means of so-called "decolourising carbon" (manufactured under the name of Norit), in the same manner that this is effected by animal charcoal in the sugar refinery. This substance has already been successfully employed for bleaching purposes in various industries, but hitherto has not been used in sugar-works, partly on account of its cost and partly because a method of regenerating was not known. It was now found that the decolourising colour of Norit can be largely restored by boiling for fifteen minutes with a 3 per cent. solution of caustic soda.

Norit is stated to exert its decolourising action on slightly acid sugar solutions, the colour being only slightly or not at all removed when the solution is alkaline. The author explains this action by reference to the properties of colloids of the nature of pectin which are transformed into larger molecular groupings in feebly acid solutions, but into smaller ones in alkaline. The large molecular groups are held by the decolourising carbon, while the smaller ones are not.

It is claimed that the decolourising power of Norit is about seventy-five times greater than granular animal charcoal. Its decolourising power is relatively greater in dilute sugar solutions as compared with concentrated ones; hence it is recommended to use Norit to bleach the juice rather than syrup. Norit is stated to possess the advantage of removing pectins and gums from sugar solutions, so that juice decolourised by this means is more easily filtered.

A continuation of the article was promised in which the practical results obtained in certain factories and refineries would be considered. These results have not reached us. (Ed. Q.A.J.)

Animal Pathology.

PROTECTION FROM WEEVILS.

The problems affecting wheat storage or, as it might be more accurately described, wheat preservation are of extreme urgency in view of the prospect of a serious shortage in the food supply of the world as one of the results of the war, and it is obviously a matter of exceptional importance to prevent, as far as possible, the destruction and loss of grain in store through the ravages of pests.

Recognising this, the British Government asked the Royal Society of London to arrange an investigation into the damage done by insects to grain in store throughout the Empire.

The Executive Committee of the Commonwealth Advisory Council of Science and Industry received, through the Prime Minister's Department, in October, 1916, a request from the Royal Society that a committee should be appointed in Australia to co-operate with similar committees in England and Canada in this investigation. Reports were obtained from the Government Entomologists of each State, and it was shown that considerable losses were caused annually in Australia from grain weevils and other pests. The Executive Committee thereupon appointed a special committee to make further investigations.

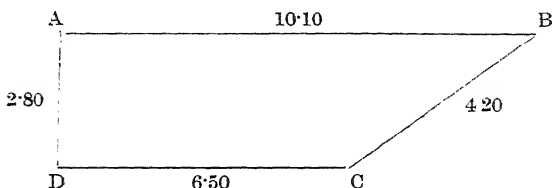
This special committee included Mr. Leo Russell, representing the Milling Industry; Professor W. A. Haswell, F.R.S., Professor of Zoology in the University of Sydney; and Mr. W. W. Froggatt, Government Entomologist, New South Wales. Mr. F. B. Guthrie, Chemist to the Department of Agriculture of New South Wales subsequently joined the committee. The progress report prepared by this special committee has now been published in Bulletin No. 5 of the Advisory Council, and can be obtained post free from the Secretary, 314 Albert street, East Melbourne. The report indicates that only the two grain weevils (*Calandra granaria* and *C. oryzae*) demand special measures on account of their destructive effects on stored grain, that the development of weevils in wheat and their increase in number may be checked by not using old bags which may be weevil-infested or storing in buildings likewise infested, and that bags of weevil-infested wheat should not be brought into contact or near that which is sound, for before wheat can become infested there must be a female to lay her eggs in the grains of wheat. It is only when the perfect insect, after going through the various stages of its larval existence, emerges through a tiny hole in the grain that the damage is evident, and except during the pupating state destruction is going on during the whole life of the insect. Under suitable conditions it takes from nineteen to twenty-two days from the egg to the adult beetle, and in three months in one experiment 40 weevils produced 3,056 descendants. Under the present system of handling wheat the destruction of weevil, once it has gained access to the bagged grain, seems hopeless; many methods of fumigating grain have been tried, and so far the most effective is that of poisoning with the fumes of carbon dioxide, but with bagged wheat this is not applicable save at a prohibitive cost. Sun-dried wheat contains only 4.7 per cent. of moisture. Neither in this nor in wheat as it emerges from the thresher with a moisture content up to 6.7 per cent. will weevil breed. With 8 per cent. of moisture they died in six weeks without breeding, at 9 per cent. they remained dormant, but with anything above the latter, provided they had free air, they became active and bred. It would thus appear that dry wheat stored in airtight bins is immune from the attack of weevils. Wheat when first bagged does not, under ordinary circumstances, contain sufficient moisture to enable weevils to breed, therefore, unless moisture is added from without, the grain remains weevil-proof. Thus, if stored in a fairly dry climate, completely protected from the weather, it is certain that wheat may be stored for an indefinite period without any damage from weevil.

General Notes.

TO MEASURE LAND WITHOUT THE AID OF INSTRUMENTS.

In the case of a four-sided field, each of the sides being of unequal length, a surveyor would commence by running a line which would divide the field into two triangles, and would then calculate their area by a mathematical process, unintelligible to most working farmers. Any man, however, who can add and multiply, may reckon up the number of acres in any four-sided field without recourse to either surveyor, theodolite, or trigonometry.

Suppose a field, whose four sides are, respectively, 4.20 ($4\frac{1}{5}$), 6.50 ($6\frac{1}{2}$), 10.10 ($10\frac{1}{10}$), and 2.80 ($2\frac{4}{5}$) chains in length, as shown in the diagram:—



First, add the two opposite sides together, and divide by 2, thus:—

$$AB + CD = 10.10 + 6.50 = 16.60 \div 2 = 8.30$$

$$AD + BC = 2.80 + 4.20 = 7 \div 2 = 3.50$$

Now multiply these two results together—

$$8.30 \times 3.50 = 2.90500$$

Cut off five figures from the right. (Note that in ordinary decimal multiplication four figures would be cut off.)

You now have:—

$$2.90500 \text{ or } 2 \text{ acres and a fraction.}$$

To find the roods, multiply the decimals (not the 2) by 4, and cut off five figures.

(2.) $.90500 \times 4 = 3.62000$, or 3 roods and a fraction. To find the perches, multiply the decimal figures by 40, and cut off the five decimals.

(3.) $.62000 \times 40 = 24.80000$, or 24 perches and a fraction. If the square yards are required, multiply by 30.75, and cut off seven figures.

(24.) $.80000 \times 30.75 = 9.2250000$, or 9 square yards. And for the square feet, multiply the decimals by 9 and cut off seven figures.

(9.) $.2250000 \times 9 = 2.0250000$, or 2 square feet. Thus the field is found to contain—

$$2 \text{ acres } 3 \text{ roods } 24 \text{ perches } 9 \text{ square yards } 2 \text{ square feet.}$$

SOCIETIES, SHOW DATES, Etc.

Gladstone—Port Curtis Agricultural, Pastoral, and Mining Association: Show dates: 11th and 12th June.

Minehan's Siding, *via* Townsville—Haughton River Farmer's Association, R. Walton, Secretary.

Childers—Isis Primary Producers' and Canegrowers' Association, John R. Wrench, Secretary.

Hughenden—North-Western Queensland Pastoral and Agricultural Association. Show dates: 20th and 21st May.

EXPERIMENTS TO DETERMINE THE KEEPING QUALITIES OF ENSILAGE.

The Director of Agriculture states that any process in normal seasons which will satisfactorily conserve fodder in a succulent form at a relatively low cost and maintain it in satisfactory condition, for a term of years if necessary, until the inevitable swing of the pendulum ushers in the never-to-be-forgotten drought, should commend itself to the stockowner as a solution of a very serious problem. However, turn where one will in the rural districts, the silo is the exception rather than the rule! Those who have used ensilage always want more of it; cattle, horses, sheep, and even swine, will eat it readily, and there is no better basis for a ration than this succulent for assisting to maintain animals of all kinds in sleek, healthy condition, particularly when pastures dry out and green feed is not available. It is not possible at this juncture to do more than touch on the importance of the question, but if our State is to keep up a well-earned reputation for its stock products and maintain rich and important associated industries, then the time is more than ripe for a forward move in silo construction. I am confident there is no better asset on a farm and no better stock-insurance can be found than a silo filled with palatable fodder.

In drought-time prices for hay, chaff, and other stock-foods have a habit of soaring up to a figure which hitherto has brought too many people to the verge of bankruptcy in an attempt even to simply keep their stock alive. How to overcome the difficulty of providing the equivalent of green feed, in a form which would keep in fresh condition and carry to any distance, is a matter to which some attention has been given. For the last five years we have been experimenting to ascertain the keeping and carrying qualities of ensilage, taken from silos and stacks. It is a well-known fact that within forty-eight hours after a surface of ensilage is exposed to the air, some signs of deterioration (mould) begin to take place, and to obviate this the usual practice in the silo is to lightly rake over the face of a mass of chaffed fodder, about twice a day, to gather enough food on each occasion for a given number of animals. Different ways of putting up conserved fodder to carry it to a distance, without deterioration, have been tried. We now have satisfactory proof that ensilage taken fresh from a silo or stack, placed in kerosene tins and soldered up, will keep for years; different kinds made from maize, sorghums, panicum, and lucerne have been tried, and in every instance the results conclusively show that an hermetically sealed receptacle is all that is required to keep fodder in sound, wholesome condition almost indefinitely. The life of any form of galvanised iron is, of course, limited, and it was found some years ago that timber-framed silos covered on the inside face with this material required a Portland cement lining to check the corrosive action of the silage juices. Although the kerosene tins used for holding the ensilage experimented with in this way were not dressed with a non-corrosive mixture, they lasted in two instances for four years and eight months, and the contained fodder opened out in fresh palatable condition. We haven't had any precedent to work on in connection with this system, but I feel optimistic concerning the application of the principle, which in drought-time should do much to obviate stock losses and provide fodder at a moderate cost.

TO PROTECT PLANTS FROM SHELL-COVERED SNAILS.

"South African Gardening," replying to the request for a remedy against snails and mealie bug, gives the following as effective remedies:—

For Snails.—Sprinkle powdered alum round their haunts and also round plants or beds of plants to be protected; if this is persisted for a few nights a marked difference will be found. The alum does not appear to hurt vegetation.

For Mealie Bug.—Sprinkle the soil of the pots with naphthaline and just turning it in, say, half a teaspoonful to a 6-in. pot; a little may also be sprinkled on the crown of the plant. In some cases this is a deterrent more than an exterminator.

A PRINCELY CONTRIBUTION.

The London "Times" of 4th February states: A fund opened by the British Minister at Bangkok for relief of the sufferers in the flood disaster at Mackay, in Queensland, has produced over £128,000, including £5,000 from each of the Malay States.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR APRIL, 1918.

Article.		APRIL.
		Prices.
Bacon	lb.	9d. to 10d.
Barley	bush.	2s. 6d. to 3s.
Bran	ton	£5 10s.
Broom Millet	"	£33 to £38
" Sydney Market	"	£75
Butter (First Grade)	cwt.	149s. 4d.
Chaff, Mixed	ton	£3 to £5 10s.
Chaff, Oaten	"	£7
Chaff, Lucerne	"	£6 to £7 15s.
Chaff, Wheaten	"	...
Cheese	lb.	9½d. to 10½d.
Flour	ton	£12
Hams	lb.	1s. 3d. to 1s. 10d.
Hay, Oaten	ton	...
Hay, Lucerne	"	£4 15s. to £5.
Hay, Wheaten	"	...
Honey	lb.	3½d. to 4d.
Maize	bush.	4s. 2d. to 4s. 3d.
Oats	"	5s. 4d.
Onions	ton	£8 10s. to £8 10s.
Peanuts	lb.	3d. to 5d.
Pollard	ton	£7 5s.
Potatoes	"	£6 to £7
Potatoes (Sweet)	"	£2 15s.
Pumpkins (Cattle)	"	£3 to £4
Eggs	doz.	1s. 9d. to 2s. 1d.
Fowls	per pair	2s. 3d. to 7s.
Ducks, English	"	3s. to 3s. 6d.
Ducks, Muscovy	"	3s. 6d. to 5s.
Geese	"	6s. to 7s.
Turkeys (Hens)	"	8s. to 9s. 6d.
Turkeys (Gobblers)	"	15s. 6d. to 21s.
Wheat (Milling)	bush.	4s.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen bundles ... ..	...	...
Cabbages, per dozen ... ..	...	2s. to 4s.
Cauliflowers (small), per dozen ... ..	...	1s. 6d. to 2s. 3d.
Beans, per sugar-bag ... ..	...	2s. 6d. to 5s.
Peas, per sugar-bag ... ..	...	4s. to 9s.
Carrots, per sugar-bag ... ..	...	2s. 6d. to 5s.
Chokos, per case ... ..	...	1s. 10d. to 2s. 3d.
Beetroot, per dozen bunches ... ..	...	6d. to 9d.
Lettuce, per dozen ... ..	...	1s. to 1s. 6d.
Parsnips, per dozen bunches ... ..	...	6d. to 1s.
Sweet Potatoes, per sugar-bag ... ..	...	1s. to 1s. 3d.
Table Pumpkins, per sack ... ..	...	5s. to 7s.
Marrows, per dozen ... ..	...	2s. to 2s. 9d.
Tomatoes, per quarter-case ... ..	...	2s. to 5s.
Cucumbers, per dozen ... ..	...	...

SOUTHERN FRUIT MARKETS.

Article.	APRIL.				
	Prices.				
Bananas (Queensland), per case	9s. to 15s.
Bananas (Fiji), per bunch...	8s. 6d.
Bananas (G.M.), per bunch	8s. 6d.
Bananas (Tweed River), per bunch	10s. 0d.
Custard Apples, per tray	4s. to 6s.
Lemons (local), per bushel-case	8s. 0d.
Mangoes, per case
Mandarins, per case
Oranges (Navel), per case
Oranges, per bushel-case	7s. to 8s.
Passion Fruit, per half-bushel case	8s. to 11s.
Persimmons, per half-bushel case	1s. 6d. to 3s. 6d.
Pineapples (Queens), per double-case
Pineapples (Common), per double-case
Quinces, per bushel-case	3s. to 6s.
Tomatoes (Queensland), per quarter case

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	APRIL.				
	Prices.				
Apples, Eating, per case	4s. to 7s. 6d.
Apples, Cooking, per case	5s. to 6s. 6d.
Apricots, per case
Bananas (Cavendish), per dozen	1½d. to 5d.
Bananas (Sugar), per dozen	4½d. to 5½d.
Cape Gooseberries, per small box	5s. to 6s.
Cherries, per box
Citrons, per hundredweight	9s.
Cocoanuts, per sack	15s. to 25s.
Cumquats, per quarter-case	3s. to 3s. 6d.
Custard Apples, per tray	2s. 6d. to 5s.
Lemons (Lisbon), per quarter-case	4s. to 5s. 6d.
Mandarins, per case	7s. to 10s.
Mangoes, per quarter-case
Oranges (Navel), per case
Oranges (Seville), per hundredweight
Oranges, per case	3s. 6d. to 7s.
Papaw Apples, per quarter-case	3s. to 3s. 6d.
Passion Fruit, per half-bushel case	5s. to 7s.
Peaches, per quarter-case
Pears, per half-bushel case	15s. to 16s.
Peanuts, per lb.	4d. to 5d.
Persimmons, per quarter-case
Pineapples (Ripley), per dozen	1s. 6d. to 2s. 6d.
Pineapples (Rough), per dozen	1s. to 2s. 6d.
Pineapples (Smooth), per dozen	1s. 6d. to 4s.
Plums, per quarter-case
Rockmelons, per dozen
Strawberries, per dozen boxes
Tomatoes, per quarter-case	2s. to 5s.
Watermelons, per dozen

TOP PRICES, ENOGGERA YARDS, MARCH, 1918.

Animal.	MARCH.	
	Prices.	
Bullocks	£18 7s. 6d. to	£21
Cows	£14 15s. to	£17
Cows (Single) ... ..	...	...
Merino Wethers	40s. 3d.	
Crossbred Wethers	39s.	
Merino Ewes	29s.	
Crossbred Ewes	46s.	
Lambs	38s. 3d.	
Pigs (Baconers) ... ..	...
Pigs (Porkers) ... ..	...
Pigs (Slips) ... ..	...

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MARCH, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MARCH, 1918 AND 1917, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Mar.	No. of Years' Records.	Mar., 1918.	Mar., 1917.		Mar.	No. of Years' Records.	Mar., 1918.	Mar., 1917.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
Atherton	In.		In.	In.	Nambour	In.		In.	In.
Cairns	8.72	17	9.88	6.59	Nanango	9.88	22	10.13	9.12
Cardwell	18.67	36	11.18	11.71	Rockhampton	3.41	36	2.24	3.10
Cooktown	16.65	46	26.71	12.35	Woodford	5.39	31	1.80	8.57
Herberton	15.28	42	9.60	10.13		8.55	31	6.15	5.78
Ingham	8.43	31	7.39	9.98	<i>Darling Downs.</i>				
Innisfail	16.48	26	28.95	13.44	Dalby	2.91	48	0.69	2.57
Mossman	26.00	37	24.04	16.34	Emu Vale	2.79	...	0.42	0.96
Townsville	20.99	10	10.08	24.25	Jimbour	2.80	...	0.23	2.35
	8.36	47	2.54	9.31	Miles	2.97	33	0.45	5.09
<i>Central Coast.</i>					Stanthorpe	2.81	45	0.35	1.04
Ayr	7.95	31	0.48	4.91	Toowoomba	4.02	46	1.12	3.42
Bowen	6.15	47	0.77	6.27	Warwick	2.97	31	0.26	0.88
Charters Towers	3.75	36	2.28	3.70	<i>Maranoa.</i>				
Mackay	12.79	47	7.26	16.91	Roma	3.01	44	0.24	3.57
Proserpine	13.14	15	5.38	13.10	<i>State Farms, &c.</i>				
St. Lawrence	6.39	47	1.40	8.90	Bungeworogorai	2.39	4	0.52	3.96
<i>South Coast.</i>					Gatton College	3.70	...	0.54	2.97
Biggenden	4.64	...	2.80	5.04	Gindie	3.30	...	0.65	10.65
Bundaberg	5.80	35	3.08	10.71	Hermitage	2.83	...	0.57	0.80
Brisbane	5.92	67	3.05	2.79	Kairi	5.12	4	...	6.01
Childers	5.50	23	2.43	6.63	Kamerunga	17.22	...	12.64	8.81
Crohamhurst	12.30	25	10.79	8.71	Sugar Experiment Station, Mackay	12.42	...	7.14	11.25
Esk	5.06	31	1.82	4.02	Warren	3.16	4	2.12	5.49
Gayndah	3.31	47	1.65	2.22					
Gympie	6.50	48	3.17	4.05					
Glasshouse M'tains	9.21	10	8.59	8.64					
Kilkivan	4.22	39	1.35	2.92					
Maryborough	6.59	47	4.04	6.04					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for March this year, and for the same period of 1918, having been compiled from telegraphic reports, are subject to revision.

J. H. HARTSHORN, Divisional Officer.

Farm and Garden Notes for June.

FIELD.—Winter begins on the 24th of this month, and frosts will already have been experienced in some of the more exposed districts of the Southern coast and on the Darling Downs. Hence insect pests will, to a great extent, cease from troubling, and weeds will also be no serious drawback to cultivation. The month of June is considered by the most successful lucerne-growers to be the best time to lay down this crop, as any weeds which may spring up in the event of a dropping season will be so slow-growing that the young lucerne plants will not be choked by them.

The land should now be got ready for millets, sorghums, panicum, &c. Oats, barley, vetches, clover, tobacco, buckwheat, field carrots, and Swedes may now be sown. Some advocate the sowing of early maize and potatoes during this month, but obviously this can only apply to the more tropical parts of Queensland. The land may be got ready, but in the Southern districts and on the tableland neither maize nor potatoes should be planted before August, or at the earliest, in warm early districts, at the end of July. There is always almost a certainty of frosts, more or less severe, during these months. Arrowroot will be nearly ready for digging, but we would not advise taking up the bulbs until the frosts of July have occurred. Take up sweet potatoes, yams, and ginger. Should there be a heavy crop, and consequently a glut in the market, sweet potatoes may be kept by storing them in a cool place in dry sand, taking care that they are thoroughly ripe before digging. The ripeness may be known by the milky juice of a broken tuber remaining white when dry. Should the juice turn dark, the potato is unripe, and will rot or dry up and shrivel in the sand pit. Before pitting, spread the tubers out in a dry barn or in the open, if the weather be fine. In pitting them or storing them in hills, lay them on a thick layer of sand; then pour dry sand over them till all the crevices are filled and a layer of sand is formed above them; then put down another layer of tubers, and repeat the process until the hill is of the requisite size. The sand excludes the air, and the potatoes will keep right through the winter. Late wheat may still be sown, but it is too late for a field crop of onions. In tropical Queensland the bulk of the coffee crop should be off by the end of July. Yams may be unearthed. Cuttings of cinnamon and kola-nut tree may be made, the cuttings being planted under bell glasses. Collect divi-divi pods and tobacco leaves. English potatoes may be planted. The opium poppy will now be blooming and forming capsules. Gather tilseed (sesame), and plant out young tobacco plants if the weather be suitable. Sugar-cane cutting may be commenced. Keep the cultivator moving amongst the pineapples. Gather all ripe bananas. Fibre may be produced from the old stems.

KITCHEN GARDEN.—Cabbage, cauliflower, and lettuce may be planted out as they become large enough. Plant asparagus and rhubarb in well-prepared beds in rows. In planting rhubarb it will probably be found more profitable to buy the crowns than to grow them from seed, and the same remark applies to asparagus.

Sow cabbage, red cabbage, peas, lettuce, broad beans, carrots, radish, turnip, beet, leeks, and herbs of various kinds, such as sage, thyme, mint, &c. Eschalots, if ready, may be transplanted; also horse-radish can be set out now.

The earlier sowings of all root crops should now be ready to thin out, if this has not been already attended to.

Keep down the weeds among the growing crops by a free use of the hoe and cultivator.

The weather is generally dry at this time of the year, so the more thorough the cultivation the better for the crops.

Land for early potatoes should now be got ready by well digging or ploughing.

Tomatoes intended to be planted out when the weather gets warmer may be sown towards the end of the month in a frame where the young plants will be protected from frost.

FLOWER GARDEN.—No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool moist Spring time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses; and tie up, without pruning, to trellis or stakes the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the Summer bedding plants may be propagated.

Sow first lot, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground, but many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondii*, stocks, wallflower, and zinnias, &c., may be sown either in boxes or open beds; mignonette is best sown where it is intended to remain.

To grow these plants successfully, it is only necessary to thoroughly dig the ground over to a depth of not less than 12 in., and incorporate with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should then be raked over smoothly, so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well-decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days; thin out so as to leave each plant (if in the border) as least 4 to 6 in. apart.

Orchard Notes for June.

THE SOUTHERN COAST DISTRICTS.

The Notes of last month, referring to the care to be taken in the handling and marketing of all kinds of citrus fruits, apply with equal force during this and subsequent months till the end of the season.

Keep the orchard clean, and work the land to retain moisture. The handling of the citrus crop is the main work in many orchards, but where slowly acting manures are to be given their application should not be later than this month. They should be well mixed with the soil, so that when the Spring comes and the trees start a fresh growth a certain percentage of plant food will be available for the trees' use. Heavy pruning should be done now, whilst the trees are dormant. All large limbs should be cut off close to the main stem; the edges of the cuts should be carefully trimmed, and the whole wound, if of large size, covered with paint or grafting wax, so that it will not start to decay but soon grow over. When the soil of the orchard is becoming deficient in organic matter, the growing of a Winter green crop, such as mustard or rape, is well worth a trial. Clear the crop of fruit

from the part of the orchard to be so treated. Plough the land well; work the soil down fine so as to get a good seed bed, and broadcast the mustard or rape. A manuring of 4 cwt. of meatworks manure and 1 cwt. of sulphate of potash per acre will produce a very heavy crop of green manure, and the plant food not required for the production of such crop will be still available for the trees' use in Spring.

Pineapples and bananas should all be cleaned up, and the land got into first-class order. Pineapples, where at all liable to frost, should be covered with grass or other suitable material. The growth of weeds between the rows of pines on land liable to frost is one of the best ways of encouraging frosts, as frost will strike dirty, weedy ground, and severely injure the pines growing thereon, when it will do little, if any, damage where the land is kept perfectly clean—another advantage of cleanliness in cultivation.

THE TROPICAL COAST DISTRICTS.

Keep the land well cultivated—plough when necessary to bury weed growth, and get the surface of the ground into a state of thorough tilth, as moisture must be retained in the soil by cultivation to mature the Spring crop of fruit. This applies not only to oranges and other tree fruits, but to bananas and pines as well. A good start in Spring means good bunches of bananas and early-ripening pineapples. Heavy pruning can be done now in the case of all trees not carrying a heavy crop of fruit; but where citrus trees are heavily loaded, the pruning should be put off till after the Spring crop of fruit has been gathered. The spraying of the trunks and inside of the trees with the lime and sulphur wash can be carried out, and where Maori is making its appearance the sulphide of soda wash should be used as well.

THE SOUTHERN AND CENTRAL TABLELANDS.

The pruning of all kinds of deciduous fruit trees is the chief work of the month in the Stanthorpe district. Do not be frightened to prune severely—first, in the case of young trees, so as to get strong well-grown trees instead of straggling top-heavy trees; and, second, in the case of trees that are going off in the size and quality of their fruit. Where peaches, apricots, plums, or nectarines are only making very little growth and that weak, so that the fruit produced thereon is small, it is advisable to head the tree hard back, so that it will throw out some vigorous branches in Spring that will form a new head for the tree. Apples, as well as plums and apricots, are sometimes inclined to over-produce fruit spurs, which become long and straggling, and bear a large quantity of small-sized fruit. A vigorous shortening back and cutting out of such spurs will have a very beneficial effect in the quality and size of the fruit produced.

Gather and burn all prunings; and where codlin moth is present in the orchard, examine the tree carefully when pruning it, so as to see if there are any cracks, crevices, or masses or loose bark in or under which the larvæ of the moth may be hibernating. All larvæ so found should be destroyed, and if the work is carried out systematically it will tend to materially decrease the crop of moths that will hatch out the following Spring.

As soon as any part of the orchard is pruned, gather up the prunings and work the land, as a thorough winter weathering of the soil is very beneficial in its effects; and, further, it will tend to destroy many insects that may be wintering in it. The planting of new orchards or of trees to replace any that may have died, or that have been proved to be unsuitable to the district, may be continued during the month, and right on till the end of Winter.

Do not prune vines in the Stanthorpe district, as it is advisable to leave the pruning as late as possible, but vine-pruning can be done at any time now in the Roma or Central districts. Tree-pruning can be continued during the month, and the orchard should be kept well worked. Citrus fruits can be marketed. Lemons should be gathered and cured.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	MAY.		JUNE.		JULY.		AUGUST.		PHASES OF THE MOON.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6:13	5:17	6:30	5:0	6:39	5:3	6:30	5:18	The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.
2	6:14	5:16	6:30	5:0	6:39	5:3	6:30	5:18	
3	6:14	5:15	6:31	5:0	6:39	5:4	6:29	5:19	<div style="text-align: right;">H. M.</div> 4 May ☾ Last Quarter 8 26 a.m. 10 " ● New Moon 11 1 p.m. 18 " ☾ First Quarter 6 14 a.m. 26 " ○ Full Moon 8 32 a.m. The Moon will be nearest the earth on the 8th, and farthest from it on the 20th.
4	6:15	5:14	6:31	5:0	6:39	5:4	6:29	5:19	
5	6:15	5:13	6:32	5:0	6:39	5:4	6:28	5:20	
6	6:16	5:13	6:32	5:0	6:39	5:5	6:27	5:20	
7	6:16	5:12	6:33	5:0	6:39	5:5	6:27	5:21	2 June ☾ Last Quarter 2 20 p.m. 9 " ● New Moon 8 3 a.m. 16 " ☾ First Quarter 11 12 p.m. 24 " ○ Full Moon 8 38 p.m. The Moon will be nearest the earth on the 5th, and farthest from it on the 17th. It will be 12 times its diam. north of the planet Uranus on the 1st at 7:30 p.m. There will be a very partial Eclipse of the Moon on the 24th June, commencing about 7:46 p.m. and ending about 9 10 p.m.
8	6:17	5:11	6:33	5:0	6:39	5:6	6:26	5:21	
9	6:17	5:11	6:34	5:0	6:39	5:6	6:25	5:22	
10	6:18	5:10	6:34	4:59	6:39	5:7	6:24	5:22	
11	6:19	5:9	6:35	4:59	6:39	5:7	6:23	5:23	1 July ☾ Last Quarter 6 43 p.m. 8 " ● New Moon 6 22 p.m. 16 " ☾ First Quarter 4 25 p.m. 24 " ○ Full Moon 6 35 a.m. 30 " ☾ Last Quarter 10 14 p.m. The Moon will be farthest from the earth on the 15th, and nearest on the 27th.
12	6:19	5:9	6:35	4:59	6:39	5:8	6:22	5:24	
13	6:20	5:8	6:36	4:59	6:38	5:8	6:21	5:24	
14	6:20	5:8	6:36	4:59	6:38	5:9	6:20	5:25	
15	6:21	5:7	6:36	5:0	6:38	5:9	6:19	5:26	7 Aug. ● New Moon 6 30 a.m. 15 " ☾ First Quarter 8 16 a.m. 22 " ○ Full Moon 3 2 p.m. 29 " ☾ Last Quarter 5 27 a.m. The Moon will be farthest from the earth on the 12th, and nearest to it on the 24th.
16	6:21	5:6	6:37	5:0	6:38	5:10	6:19	5:26	
17	6:22	5:6	6:37	5:0	6:37	5:10	6:18	5:27	
18	6:23	5:5	6:37	5:0	6:37	5:11	6:17	5:27	
19	6:23	5:5	6:38	5:0	6:37	5:11	6:16	5:28	
20	6:24	5:4	6:38	5:0	6:36	5:12	6:15	5:28	
21	6:24	5:4	6:38	5:1	6:36	5:12	6:14	5:29	
22	6:25	5:3	6:39	5:1	6:36	5:13	6:13	5:29	
23	6:25	5:3	6:39	5:1	6:35	5:13	6:12	5:30	
24	6:26	5:3	6:39	5:1	6:35	5:14	6:11	5:30	
25	6:26	5:2	6:39	5:1	6:34	5:14	6:10	5:30	
26	6:27	5:2	6:39	5:2	6:34	5:15	6:9	5:31	
27	6:27	5:2	6:39	5:2	6:33	5:15	6:8	5:31	
28	6:28	5:1	6:39	5:2	6:33	5:16	6:7	5:32	
29	6:28	5:1	6:39	5:2	6:32	5:16	6:6	5:32	
30	6:29	5:1	6:39	5:3	6:32	5:17	6:5	5:33	
31	6:29	5:0	6:31	5:17	6:4	5:33	

*For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during May, June, and July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night, when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

GRADED SEED WHEAT!

HERMITAGE STATE FARM.

The undermentioned graded wheats (1917 Season) are offered for sale at 5/6 per bushel f.o.b. Hermitage.

Intending purchasers are advised that, owing to unfavourable weather conditions during harvesting, the grain is more or less weathered, and not as plump as usual; satisfactory germination tests, however, have been made.

The varieties consist of Hiawatha, Coronation, Piastre, and O.K., and are of Queensland Origin, and were raised and have been tested over a series of years at Hermitage State Farm, proving to be very suitable to the conditions of soil and climate of the Western Darling Downs.

These varieties are all good Milling Wheats of medium, early-maturing habit, fair rust resisters, and are already well and favourably known to those persons who have given the wheats a trial.

ROMA STATE FARM.

BUNGE 1.

Graded Seed Wheat is offered for sale at 5/6 per bushel f.o.b. Bungeworgorai.

This wheat is somewhat weathered, owing to unfavourable conditions prevalent during harvesting, and from the same cause is not as plump as usual.

Applications, accompanied by Cash Remittance, must be addressed in each case to
THE MANAGER.

Orders will be supplied according to priority of application.

CONSIGN—

WOOL

Wool.—Fenwick & Co. have ample storage for wool; and all consignments of wool, whether large or small, will receive their careful attention.

STOCK

Fenwick & Co. sell Cattle, Calves, Pigs, Sheep, and Lambs every Wednesday at Newmarket. Fenwick & Co. have paddocks handy to Untrucking Yards well grassed, naturally well watered, and with plenty of shade.

SKINS

Fenwick & Co. secure full market value for consignments of Hides, Sheepskins, Marsupial and Opossum Skins, Goat Skins, Tallow, Hair, Beeswax, etc.

Skins.—The Season for Opossum Skins is open from the 1st May, 1918, until the 31st October, 1918, but the Season for Bear Skins remains closed until the 30th April, 1919.

TO—

FENWICK & Co., ESTABLISHED 1864,

SALESMEN, EDWARD STREET, BRISBANE,
THEY WILL SECURE FULL MARKET VALUE FOR YOUR CONSIGNMENTS.

Write for Market Reports, Labels, Advice Forms, &c. Liberal Advances available against consignments of Stock, Wool, Hides, etc.

STORE STOCK, STUD STOCK, CITY PROPERTY AND PASTORAL PROPERTY LISTS.

Communicate with Fenwick & Co. if you are a Buyer or Seller. Fenwick & Co. act as Agents only.

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PART 6.

Agriculture.

DETERMINATION OF THE KEEPING QUALITIES OF SILAGE.

In connection with the report on experiments made to determine the keeping qualities of ensilage, published in the May issue of the Journal, we have received the following analyses of samples of maize and lucerne kept for different periods in sealed tins by the Agricultural Chemist, Mr. J. C. Brünnich:—

ANALYSES OF SAMPLES OF ENSILAGE—DIRECTOR OF AGRICULTURE.

	1. Maize—Kept in Sealed Tin 8 Months.	2. Maize from Overground Silo—4 years 8 months in Sealed Tin.	Lucerne from Pit Silo— Kept 4 years 8 months in Sealed Tins.
	Per cent.	Per cent.	Per cent.
Water	64.50	70.50	69.00
Dry Matter	35.50	29.50	31.00
Crude Protein	2.69	3.08	3.81
Ash	3.73	3.70	3.72
Crude Fibre	7.10	8.50	11.45
N-free Extract	21.38	13.52	11.22
Ether Extract	0.60	0.70	0.80
Digestible Protein	1.80	2.12	1.81
Amido Nitrogen	0.24	0.24	0.24
Ammonia Nitrogen	0.025 .01—.03°	0.067	0.105
Acidity (as Lactic Acid)	1.00 .95—1.7°.	2.25	2.37 2.52°.
<i>Percentage Dry Material.</i>			
Crude Protein	7.57 8.0	10.45	12.30 14.2
Ash	10.50 6.5	12.56	12.00 11.8
Crude Fibre	20.00 24.0	29.90	37.00 33.4
N-free Extract	60.24 58.5	45.71	36.10 35.0
Ether Extract	1.69 3.0	2.38	2.60 5.7
Per cent. Protein Digestible	67 .65	68	47 30 (P)
Ratio Amido to Total N.	1:1.73 1:2.35	1:2.22	1:2.53 1:2 +

The figures in the second column, "Maize and Lucerne from Pit Silo," represent the average or usual values for good maize or alfalfa silages of corresponding water content.

The samples of maize ensilage possess a composition in the main corresponding to maize ensilage generally. Such departures as are apparent will be largely resultant upon the actual composition of the ensiled material.

The high acidity of the second maize sample is noteworthy. Considering the acidities normally developed in *lucerne* silage it is, however, probably not excessively high.

The digestibilities of the protein and the protein-non-protein ratios are near normal for these classes of feeds.

Referring to the "nitrogen present as ammonia," the samples sealed for the longer period appear to contain a somewhat high amount. This is taken as indicating that there may have been certain subsidiary changes after removal from the silo which partake of the nature of putrefactive or degenerative alterations. However, in absence of knowledge of the ammonia content of the freshly removed material that such change has occurred cannot be definitely maintained. The appearance and odour of the material would be pronounced satisfactory.

The protein content of the lucerne sample is somewhat low and the fibre high, arising, it is supposed, from the somewhat "stemmy" nature of the sample.

ANALYSIS OF GIANT HONDURAS SORGHUM (EXPERIMENTAL PLOTS)—DIRECTOR OF AGRICULTURE.

—	Fresh Material.	Water-free.	Composition Average green Sorghum fodder.	
	Per cent.	Per cent.	Fresh.	Water-free.
Water	70.70	..	75.1	..
Crude Protein	1.51	5.20	1.5	6.0
Ash	1.79	6.20	1.4	5.6
Crude Fibre	13.00	44.80	7.0	28.0
N-free Extract	12.70	42.80	14.0	56.0
Ether Extract	0.30	1.00	1.0	4.0
Digestible Protein	1.01	3.46	1.0	4.0
Percentage Protein Digestible	66.00	..	65-68.00	..
Hydrocyanic Acid	Nil.	..	..	..
Starch Equivalent	14.3	..	16.0 (at correspond-	ing water content)

The high content of fibre is remarkable, and is attributable to the high proportion of stalk and little flag. To the same cause is attributable, probably also, the slight deficiency in protein.

THE UTILITY OF SEED SELECTION.

Many plants, through natural agencies, are so prone to cross-fertilisation that existent varieties soon lose their best characteristics unless special precautions are taken by the grower to preserve them; with farm seeds the tendency generally is to pay too little attention to their purity and the type and kind sown.

Much can be accomplished by the individual farmer in improving the yield of his crops, by sowing or planting proved strains of seed,

cuttings, tubers, &c., the prolificacy and character of which have been determined, and fixed by judicious selection from high-producing plants.

More land must be cultivated and more fertilisers used when poor-yielding varieties of cultivated crops are raised, and it is obvious that energy and money are to be saved by growing tested varieties of standard commercial value, which, under normal conditions, can be confidently expected to perpetuate their good qualities in the resultant crop.

It is to be recognised also that enhanced yields are to be looked for and better prices obtained by raising crops from acclimatised seed selected with due regard to local conditions, and marketing the more uniform quality of produce to be expected therefrom.

Stockowners are alive to the fact that perfection in animal-breeding, whether for beef or dairy quality, is only attainable by combinations of essential unit characters, and by careful breeding of selection and by systems of feeding to ensure proper individual development. When agriculturists realise that similar principles underlie plant improvement, it is certain their general adoption will do much toward furthering personal welfare and, indirectly, that of the community. The farmer of to-day, for the most part, has little opportunity to consistently follow up the work involved in seed-improvement. As an individual, he has suffered in the past through the introduction of weed seeds and inferior non-pedigree seeds to his land, but now enjoys a measure of protection (hitherto unknown) through the beneficent operations of the Pure Seeds Act.

The initiated well know that whereas certain kinds of seeds can be readily raised here, others must be grown in cooler latitudes and introduced to meet each season's requirements.

The Department of Agriculture has procured and tested from time to time a considerable number and variety of new plants and seeds, and an organisation has been established which aims at the improvement of certain farm crops and the handling and sale of pure seed of these kinds, so that farmers may now have the opportunity of securing acclimatised seed and participating in the benefits to be derived from sowing high-yielding strains, evolved by approved methods of selection.

H. C. QUODLING, Director of Agriculture.

SHORT DESCRIPTIONS OF VARIETIES OF MAIZE, SORGHUMS, &c., ADVERTISED FOR SALE.

Improved Yellow Dent Maize.—Heavy-yielding variety, recommended for coastal districts and scrub lands where there is a good rainfall. Takes from five to six months to mature. Strong grower, attaining over 12 feet in height on rich land. Ears robust, semi-erect in habit, cylindrical in shape, about 10 inches in length and well protected by the husk from the weather and insect attack. Rows 14 to 18 in number; bold, fairly hard type of grain, inclined to wedge shape; somewhat over medium size and of good depth and thickness. Colour rich amber, with characteristic yellow tip, the dent varying from medium to rough. Good fodder corn.

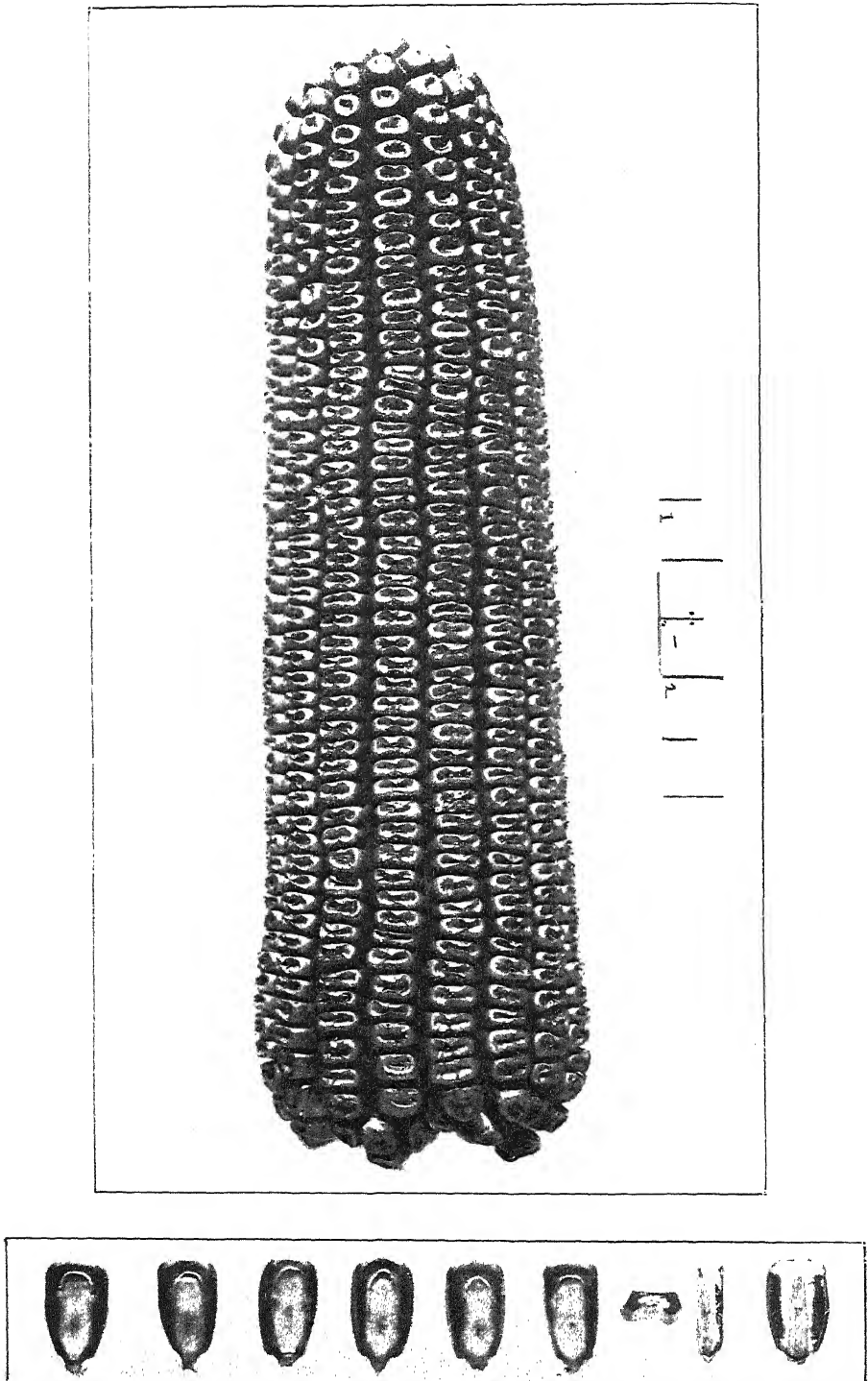


PLATE 15.—IMPROVED YELLOW DENT.

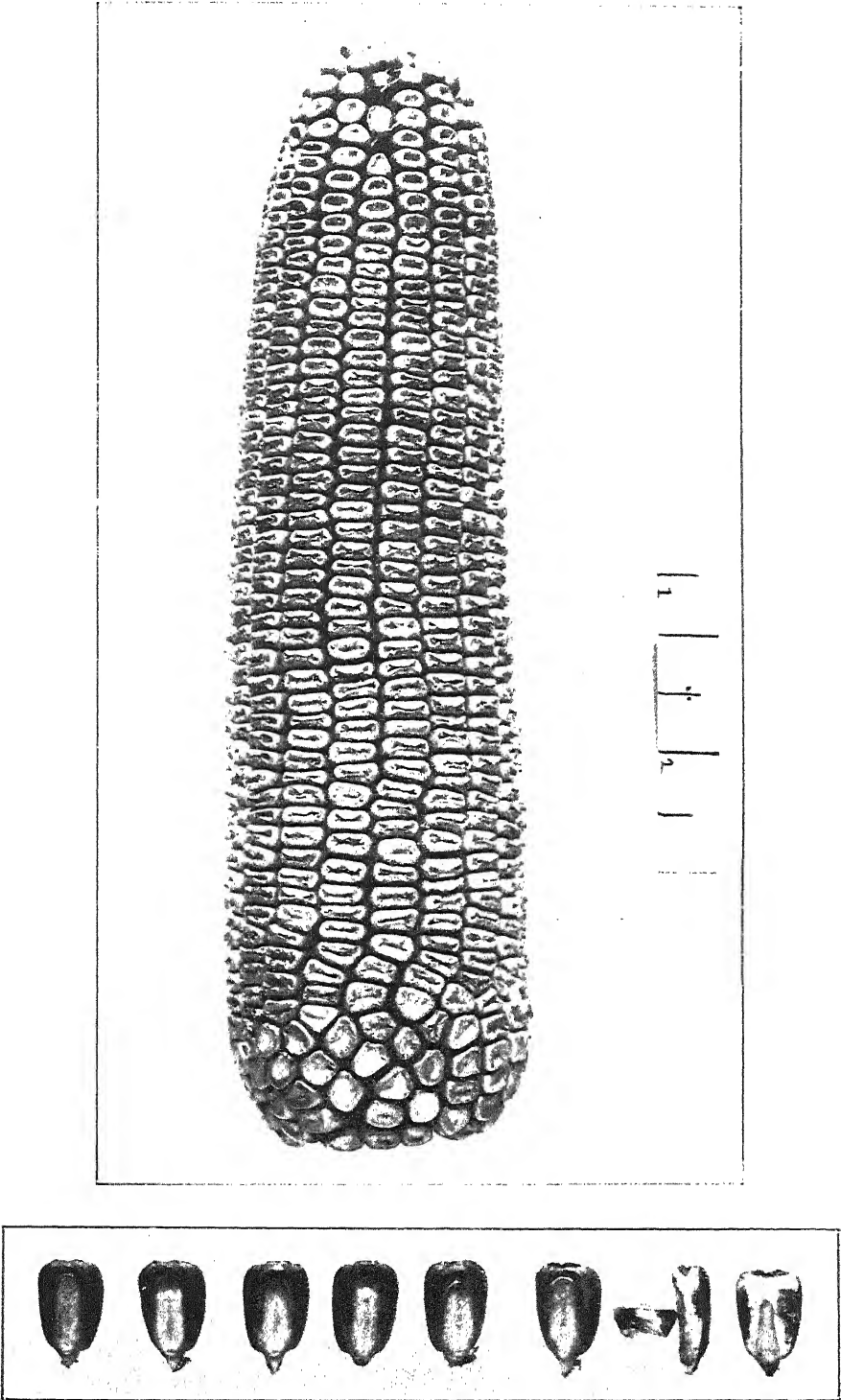


PLATE 16.—STAR LEARNING.

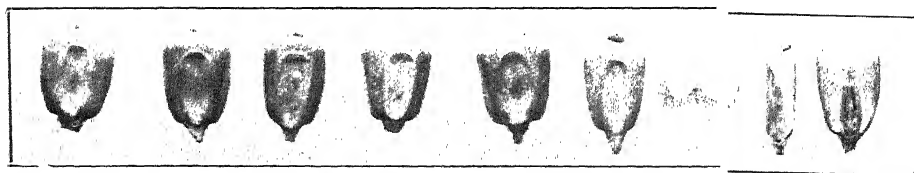
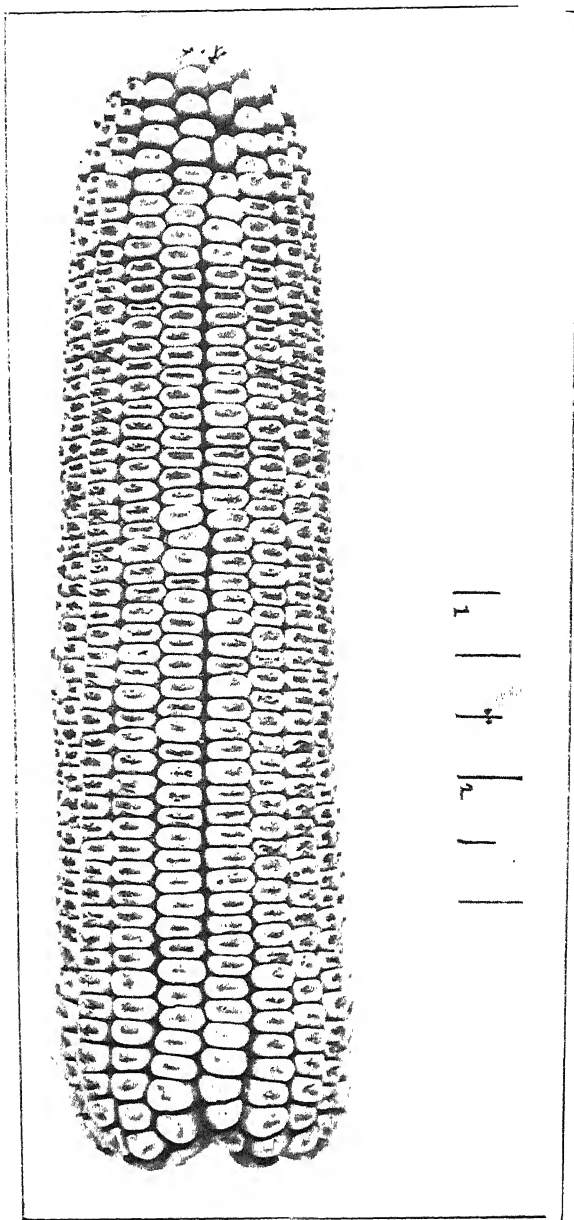


PLATE 17.—BOONE COUNTY WHITE.

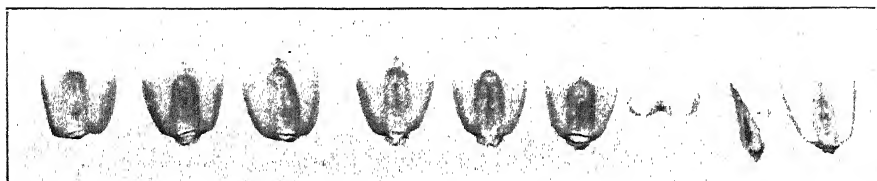
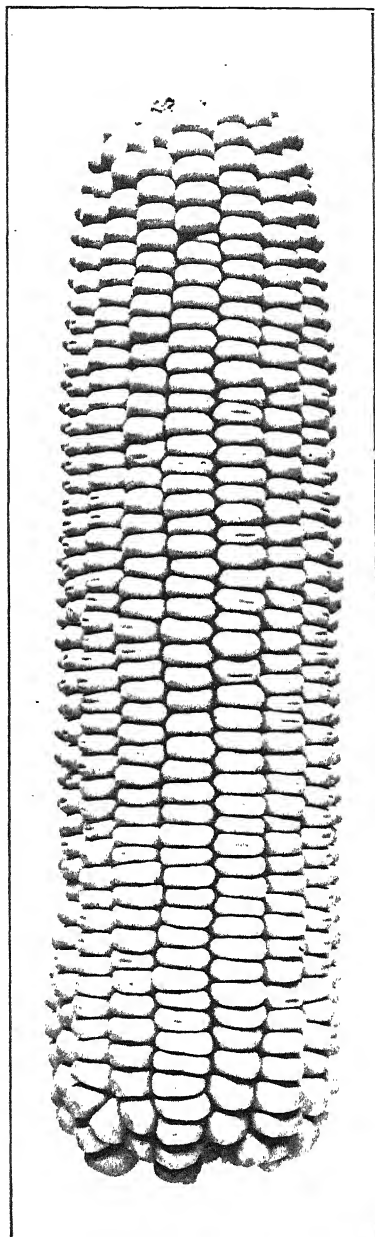


PLATE 18.—BRAZILIAN WHITE.

Hawkesbury Champion.—Heavy-yielding variety when grown on rich alluvial or scrub lands. Requires a long-growing season of six months, and a good rainfall. Very strong grower with robust stalk, up to 14 feet in height. Ears large, up to 12 inches in length; fairly good husk covering. Rows usually 14; very large, bold, flat grain of good thickness. Colour amber, with yellow cap; long smooth dent. This variety has its origin on the rich alluvial lands of the Hawkesbury River, a locality noted for its high yields of maize. Is sometimes called "Golden King."

Star Laming.—Matures in slightly over 120 days. Recommended for districts where a short season calls for the selection of a quick-maturing hardy type of maize, and where this crop has to be grown on the lighter classes of land. Crop from which seed was secured, tasselled in seven weeks from date of planting. Plants attain a height of from 7 to 8 feet and carry much foliage. Tassels large, bearing abundant pollen; silks plentiful. Ears borne midway on stalk and comparatively long, 9 to 10 inches pendulous, when ripe. Rows of grain 16 to 18 in number, and tightly packed on ears, which fill well at butts and tips. Husk covering light, but affording sufficient protection. Grain blunt-wedge shape; under medium size and of bright amber colour; yellow cap with crease dent.

Reid's Yellow Dent.—Matures in about 125 to 130 days. Had its origin in America over seventy years ago. The ears of this variety are perhaps more perfect in character and appearance than any other maize.

Good results have been obtained on the coast and inland districts up to 320 miles from the seaboard, at the Roma State Farm, indicating the cosmopolitan character of the variety. Plants 8 to 10 feet in height; stalk light, leafy, somewhat inclined to sucker. Tassels bear abundant pollen; silks plentiful. Ears robust, borne slightly above the middle of stalk, length 10 to 11 inches, pendulous when ripe. Rows of grain 18 to 20, closely and tightly packed. Inclination for tip of ear to be exposed when growth is forced on rich lands.

Boone County White.—A standard pearl-white variety, taking 135 to 145 days to mature. Well suited for coastal districts where a good rainfall is experienced. An excellent grain for cornflour manufacturing purposes, and is also a palatable fodder variety on account of its abundance of leaf and the high saccharine content of its stalks. Plants 8 to 10 feet in height. Ears robust, compact, cylindrical in shape, uniform in character, pendulous when ripe, 10 to 11 inches in length. Butts and tips well filled. Grain medium in size, blunt wedge-shape and of medium thickness, 18 to 20 rows to the ear. Husk covering fair. A prolific yielder on good land.

Cornplanter.—The favourite pearl-white variety of the Upper Murray, possessing similar characteristics to Boone County White, only slightly coarser, with somewhat larger grain.

Brazilian White.—The Bread Mealie of South Africa. A soft, starchy maize, useful for cornflour manufacturing purposes, and for making meals for consumption on the farm. Matures in 135 to 145 days;

suitable for coast and intercoastal districts. Plants 8 to 10 feet high, bearing two, and sometimes three, ears to the stalk. Ears compact, of medium size, well filled at butts and tips. Rows of grain regular, 12 to 14 in number. Grain slightly under medium size, smooth, soft, and starchy; creamy-white in colour, with a characteristic smooth dimple dent.

Grain Sorghums.—Yields have been improved by selection. This group of plants is particularly valuable for many reasons, one of which is that they will reproduce themselves and give excellent returns in the face of dry conditions, where maize would fail to give a crop. Excepting "Giant Honduras," which is suited to sub-tropical and tropical conditions, the other varieties, Cream Milo, Feterita, Standard Milo, Dwarf Milo, Shantung, Dwarf Kaoliang, Valley Kaoliang, and Red Kaffir Corn take three and a-half to four months to mature. All have been tested on the coastal and inland areas, and have borne out their reputation for hardihood, and can be recommended for both situations. They will grow in a variety of soils. Tests for grain production have been made, and the yields ran from 50 to 103 bushels per acre: the latter yield being secured at Boonah from Cream Milo. The grain is high in nutritive character, almost equal to wheat. White-coloured (Feterita) and cream-coloured (Cream Milo) make excellent porridge; the others, on account of seed-colour, are not suitable for this purpose, but all make excellent meal. These grains may be used whole or ground for horses, cattle, pigs, and poultry, and are invaluable. No mixed farm should be without its grain-sorghum patch. Spring and summer are the correct seasons to sow seed.

Giant Honduras Sorghum.—Non-saccharine; strong grower, 18 feet; requires rich land and a good rainfall. Takes several months to mature. Fodder yield obtained this season at Toogoolawah, on alluvial land, 41 tons 2 cwt. per acre. Useful as a bulky silage crop, but must not be left too long after it comes into head, as like all non-saccharine sorghums, the stalks become pithy.

Saccharine Sorghums.—The two fodder sorghums—*S. Saccharatum* and Early Amber Cane—have been improved by a system of selection to secure a heavy yielding green fodder strain. Yields from Departmental plots gave 18 and 21 tons per acre, respectively.

Soudan Grass.—Recommended as a hardy, drought-resisting fodder crop, suitable for silage and making a coarse palatable hay. Will grow on almost any class of agricultural land, and yielded over 10 tons of green fodder per acre at the Roma State Farm, on light sandy soil. Can be cut with open-backed reaper and binder. First cutting matures in from eight to ten weeks; a second cutting obtainable, and a light cutting may be expected in the second season.

Phalaris minor (an annual).—A winter and early spring-growing grass, suitable for the Downs. At Hermitage State Farm, on heavy black soil, this grass provided excellent feed for sheep and other stock, and is recommended for trial as a grass to fill a long-felt want.

(See advertisement in this issue.)

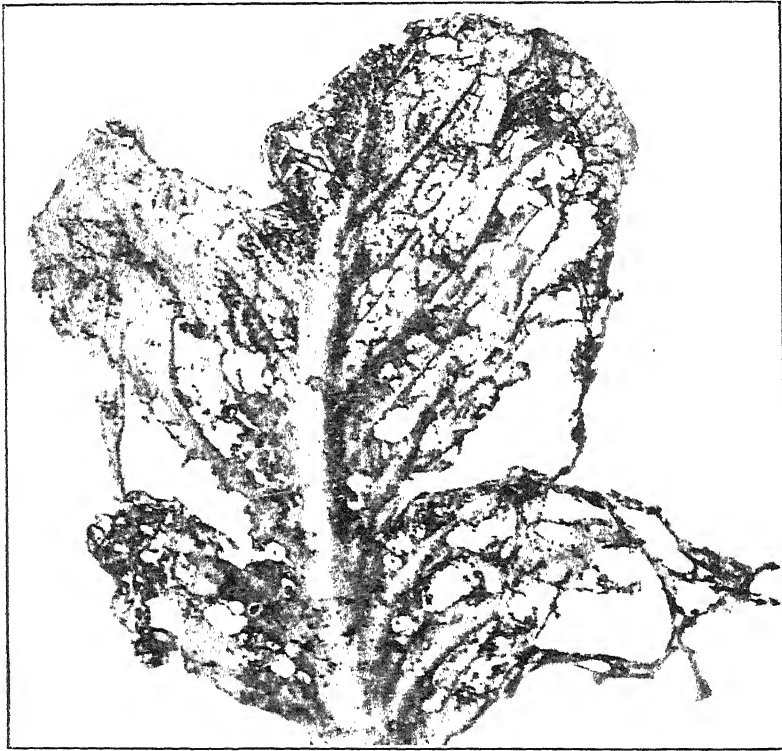
MARKET GARDENING.

THE SMALL CABBAGE MOTH.

There will be lots of trouble this autumn and winter from the small cabbage moth, unless readers watch their cruciferous crops carefully. Cruciferous crops are those of the cabbage family, and include the cauliflowers, kales, turnips, &c., of the vegetable garden, and more particularly stocks in the flower garden.

The trouble has already been brought to our notice on several occasions, and it will increase rapidly with the advent of the drier days of winter.

The illustrations reproduced with these notes have been specially prepared by the Division of Entomology with the object of making everyone familiar with the pest,



THE WORK OF THE CABBAGE MOTH.

Showing how leaves are eaten by the larva of the moth, from an illustration by the Division of Entomology.

and the damage it does, in the hope that a united effort may limit its numbers before they increase to such an extent that it is next to impossible to grow a cabbage, &c., free from its unwelcome attentions.

The pest is spread by crops being sent from infested areas to be sold in clean districts. Eggs, larvæ, and cocoons have been regularly found on both bags and crates, and the cabbages themselves. It behoves those whose gardens are free from the pest to guard against introduction in this way by destroying any suspected leaves purchased for culinary purposes.

THE EGG AND LARVA.

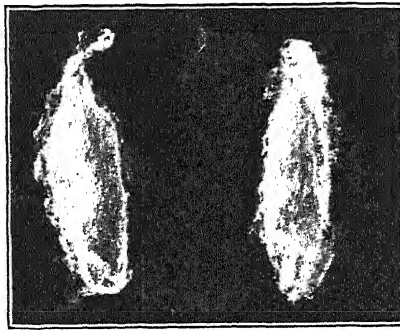
It is proposed to describe the pest as briefly as possible in its various stages of life. Before doing so we wish to acknowledge the assistance in this endeavour afforded by the recent investigations of Mr. D. Gunn, of the Division of Entomology, Pretoria, whose recommendations only enable us to give anything approaching a complete account of the moth. Previous to his investigations little was known of the life history of the pest, and until this is worked out the proper means of combating it cannot be given—the aim being to destroy it at the most vulnerable stage of its life.

The eggs are greenish-yellow, and on account of this colouring it is next to impossible to observe them without a magnifying glass. They are laid on the upper surface of the leaves, usually near the veins.

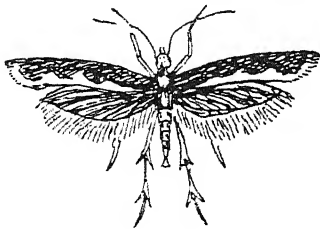
When the larva emerges from the eggs, it is somewhat less than a fifth of an inch in length, and light-green. After a few days' feeding it assumes a darker colour, and when closely examined a deeper green stripe may be detected down the middle of the back. When full grown the larva is only two-fifths of an inch. It must not be despised, however, on account of its size, as it is capable of doing immense damage. A characteristic liveliness when disturbed, and the fact that after wriggling in an erratic manner it drops either to earth or part of the way, suspended by a silken thread, should make recognition easy. The larval stage lasts about fifteen to eighteen days in summer, and much longer in winter, during which time it feeds on the under surface of the leaves, spinning a gauze-like web over the part of the leaf upon which it happens to be busy.



Larva.



Cocoons.

Pupa removed
from Cocoon.

Adult.

(All enlarged.)



Adult, side view.

THE COCOON AND ADULT.

When mature, the larva encloses itself in a gauze-like cocoon, and gradually becomes a pupa, remaining attached to the under surface of the leaf. In this stage it remains from five to seven days in the summer, and about fourteen days in the winter.

The moth, which emerges, has ash-grey fore wings and light-brown hind wings. The fore wings are covered with a number of black dots, with white stripes on the inner margins, making them appear somewhat diamond-shaped when folded in rest.

They are night flyers, and may frequently be seen around bright lights. When disturbed amongst their food plants during the day they are weak fliers, and never travel far. They only live a few days, from about seven to ten.

From what has been written above, it will be seen that the life of an individual insect is not long, and it may be safely guessed that the number of generations is correspondingly large. During the investigations carried out by Mr. Gunn, ten generations were reared in a few days over a year. The larva of the moth is attacked, and destroyed by several insects—notably the green mantid, but unfortunately it does not appear until about the end of October, by when most of the damage is done.

REMEDIES.

The insect is comparatively easy to control in the larval stage by spraying the plants with the well-known arsenate of lead solution—i.e., 3 lb. arsenate of lead paste or $1\frac{1}{2}$ of powder, dissolved in 50 gallons of water.

The bloom of the cabbage plants prevents the solution adhering really well, and Mr. Gunn found that if 2 lb. of resin were added to each 50 gallons the remedy was much more effective.

Arsenate of lead powder being easier to weigh, it is recommended in preference to paste.

On account of its poisonous nature, arsenate of lead is not recommended for use on mature plants, and for this reason experiments were made with other solutions.

Tobacco extract (one gallon to 50 of water) was found to destroy the larva readily, but whatever brand be used it should contain at least 6 per cent. nicotine, and be non-arsenical. Soap or resin should be added to make the solution more adhesive. Two pounds of either to 50 of water will suffice. It will be found convenient to dissolve them in a little hot water, and add to the bulk solution when dissolved.

In his experiments Mr. Gunn used an insecticide not commonly known to our readers. We thus purpose giving you the recipe in his own words. It is known as

TAR EMULSION, OR TAR WATER,

and is prepared as follows:—Gas or coal tar, 1 gallon; soap, 2 lb.; water, 180 gallons.

As the above quantity may be considered too large to prepare at one time, formulae for the preparation of smaller quantities are given:—

Gas or coal tar, $1\frac{1}{2}$ bottles, $\frac{3}{4}$ bottle, $\frac{1}{2}$ bottle.

Soap, 9 ounces, 5 ounces, $2\frac{1}{2}$ ounces.

Water, 50 gallons, 25 gallons, 10 gallons.

First place 2 gallons of water in a pot over a fire until it boils. Then place the soap, which has been cut in small pieces, into the water. After the soap has been dissolved, put the tar in the pot, and allow the mixture to cook for two hours. The mixture should be frequently stirred, and after it has been thoroughly cooked, the remainder of the water should be added. It is preferable to spray the preparation immediately after it has become cool, as it has been found by practical experiments that better results are obtained than if it is allowed to stand for some time.

The tobacco and tar mixtures have to be sprayed directly upon the insect to destroy it, and they are therefore known as contact insecticides. As the larvæ invariably feed upon the under-side of leaves of plants, it is essential that an under-spray attachment should be used.

For spraying a small plot in a garden, a bucket or knapsack spray-pump will be found to be satisfactory, but when a field has to be treated, a barrel spray-pump placed on a trolley is necessary, in order to perform the work expeditiously.

Cabbage and cauliflower plants which are grown in seed-beds are liable to become infested with the larvæ of this moth, and they should therefore be sprayed before being planted out in gardens or fields. If this is not done immediately after the larvæ are observed, the leaves may become full of small holes and the plants may become stunted in their growth or even destroyed.

When a garden or field has become infested, all old plants left after the crop has been gathered should be pulled up and either burned or covered in deep pits in the soil. If this is not done, these plants will continue to be breeding places for the insect and cause the infestation of young cabbage and cauliflower plants at a later date.—“South Australian Gardening and Country Life.”

THE VALUE OF THE COMPOST HEAP.

The great value of a compost heap to the market gardener is not generally recognised by those to whom it would be of immense service at all times, but especially at a time like the present, when artificial and indeed most natural animal manures are either unobtainable or obtainable in insufficient quantities. What is a compost heap? The "Farmers' Handbook," issued by the Department of Agriculture of New South Wales, thus describes its composition:—

The compost heap is a most valuable adjunct to the farm, and it is a very great pity that it is not more frequently to be found. A heap or pit can be made very economically, and is of special value in that it utilises all sorts of vegetable and animal refuse, which would otherwise be wasted, and converts it into a valuable manure, rich in organic matter, and eminently suited for soils low in humus or subject to droughty conditions.

The principle of the compost heap is the fermentation of easily-decomposed vegetable matter in the presence of earth and lime. It is not only substances like peat and straw, which form the usual basis of compost heaps, that are thus decomposable, but almost every kind of organic substance, both of vegetable and animal origin, can be thus composted.

Dead leaves, bush scrapings, sawdust, weeds, tops and stalks of vegetables, as well as bone and animal refuse, can be treated in this manner. In the case of animal refuse, the operation is much slower, and substances like bone should be first crushed. It is also important to be sure that animal refuse so treated is not derived from a diseased source.

As a general method of procedure the following will be found satisfactory:—Make a heap with alternate layers of earth, refuse, and lime. Under the term "refuse" is included all the refuse material of animal or vegetable material mentioned above. Cover the whole with a layer of earth. When a sufficient quantity of refuse is again collected, place it on top of the heap and cover with a layer of lime, and lastly of earth, until the heap is 3 or 4 ft. high. The heap should be kept moist, and for this purpose all refuse water from the house, slops, urine, &c., should be added. The heap may be conveniently watered by making a hole into the interior and pouring the liquid in. The outer covering of earth has the object of absorbing any ammonia which is evolved in the process of fermentation and by the action of the lime.

When the heap has been prepared it must be left to itself to ferment for some time. Probably a few months will be sufficient unless very refractory substances, such as bone, &c., are present. In a few months' time it should be well forked over and another layer of lime, and finally of earth, should be added. In the course of another month or two it should be ready for use, and you will have provided yourself at a very slight cost with an excellent manure, rich in humus, and will have utilised for the purpose a great amount of refuse material which would otherwise be lost or burnt.

Instead of a heap the compost may be conveniently prepared in a pit. In either case the bottom should be cemented, or so drained that the liquid escaping from the mass can be collected and returned to the compost.

It will be found advantageous to prepare a second heap while the first one is ripening and being used. It will also be found that if it is desired to use more concentrated fertilisers, such as superphosphates, potash, and ammonium salts, these can be mixed with advantage with the compost manure before being applied to the land. Used in this way they will be in less danger of leaching away, and will be of greater benefit than if applied directly to the land.

A PRINCELY GIFT FROM SIAM.

In the May issue of the Journal we published an extract from the "London Times," in which it was stated that the Federated Malay States had contributed £128,000 to the Mackay Flood Relief Fund. The "Brisbane Courier" made a search for the paragraph in the "Times," but no reference to the announcement could be found. The matter has been cleared up, however, by the receipt of a letter by the Acting-Premier from the Agent-General, in which he says:—"The British Minister at Bangkok has informed the Colonial Office that there is no foundation for the report that a relief fund was raised for the sufferers by the Queensland floods, and he suggests that the Press statements have confused the Mackay Fund with an amount raised for the relief of sufferers from the floods in Siam."

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Books is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
 The Shorthorn Herd Book of Queensland;
 The Jersey Herd Book of Queensland;
 The Illawarra Herd Book of Queensland;
 The Ayrshire Herd Book of Queensland;
 The Milking Shorthorn Herd Book of Queensland;
 The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS.				
AYRSHIRES.				
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	10	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview," Southbrook	7	34	Do.
JERSEYS.				
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoorra	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, <i>via</i> Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.

DAIRY BREEDS—*continued.*

GUERNSEYS.

Queensland Agricultural College	Gatton	2	2	Eligible, but no Guernsey Herd Book of Australia
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HOLSTEINS.

Queensland Agricultural College	Gatton	2	9	Holstein-Frisian Herd Book of Australia
George Newman	.. "St. Athan," Wyreema	12	47	Do.
F. G. C. Gratton	.. "Towleston," Kingsthorpe	1	..	Do.
R. S. Alexander	.. Glenlondond Farm, Coolumboola	1	3	Do.
Ditto	.. Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings	.. St. Gwithian, Toogooloowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff	.. Inavale Stud Farm, Bunjurgun, Q.	3	9	Do.
E. Swayne, M.L.A.	.. West Plane Creek, Mackay	1	2	Do.

ILLAWARRA.

A. Pickels	.. .. Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	.. Corndale, Coolabunia	2	36	Do.
W. T. Savage	.. .. Ramsay	2	22	Do.
Hunt Bros.	.. .. Springdale, Maleny..	3	62	Do.

MILKING SHORTHORNS.

P. Young	.. .. Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	.. .. Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	.. .. Torran's Vale, Lane-field	1	9	Do.
W. Middleton	.. .. Devon Court, Crow's Nest	3	27	Do.

BEEF BREEDS.

SHORTHORNS.

T. B. Murray-Prior	.. Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall	.. Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan	.. "Arubial," Condamine	3	6	Do.
W. B. Slade	.. .. E. Glengallan, Warwick	2	20	Do.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
BEEF BREEDS—<i>continued.</i>				
HEREFORD.				
A. J. McConnell ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Do.
Tindal and Son ..	Gunyan, Inglewood	50	400	Do.
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book of England

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RETURNS OF COWS FROM 30TH MARCH, TO 29TH APRIL, 1918.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Melba ..	Holstein ...	31 Mar., 1918	1,176	3.5	45.54	
Leda's Jessie ..	Jersey ..	25 Mar. "	534	5.5	34.75	
Lady Margaret ..	Ayrshire ...	27 Dec., 1917	693	4.4	34.22	
Leading Lady ..	Jersey ..	26 Dec. "	459	6.2	33.69	
Constancy ..	Ayrshire ...	7 April, 1918	601	4.8	32.52	
Miss Bell ..	Jersey ..	27 June, 1917	452	5.8	31.00	
Violette's Peter's Girl ..	" ..	26 Oct. "	434	5.8	29.77	
Sweet Meadows ..	" ..	8 Aug. "	407	6.0	28.92	
Netherton Belle ..	Ayrshire ...	17 July "	464	5.2	28.48	
College St. Margaret ..	Jersey ..	9 Nov. "	426	5.6	28.19	
Burlesque ..	" ..	6 Oct. "	345	6.4	26.07	
Jeannie ..	Ayrshire ...	13 Dec. "	607	3.7	24.98	
College Bluebell ..	Jersey ..	28 June "	345	6.1	24.90	
Thornton Fairetta ..	" ..	30 June "	296	7.0	24.59	
Hedge's Nattie ..	Holstein ...	1 Feb., 1918	663	3.3	24.06	
Lady Spec ..	Ayrshire ...	19 Feb. "	731	3.0	24.06	
College Dandel ..	Holstein ...	12 July, 1917	478	4.4	23.70	
Miss Edith ..	Jersey ..	23 Dec. "	503	4.2	23.66	
Royal Mistress ..	Ayrshire ...	13 Mar., 1918	513	4.1	23.52	
Songstress ..	" ..	1 Oct., 1917	402	4.9	22.22	
Miss Bee ..	Jersey ..	23 Jan., 1918	546	3.6	21.84	
Comedienne ..	" ..	13 Dec., 1917	378	5.1	21.78	
Iron Plate ..	" ..	14 Oct. "	505	3.8	21.38	
Miss Edwion ..	" ..	12 Nov. "	469	4.0	20.96	
College Ma Petite ..	" ..	10 Nov. "	411	4.5	20.78	
Lady Dorset ..	Ayrshire ...	14 Aug. "	451	4.2	20.71	
Belinda ..	" ..	14 Jan., 1918	568	3.3	20.70	
Lady Peggy ..	" ..	30 Mar. "	515	3.6	20.60	
Hedge's Madge ..	Holstein ...	22 Mar., 1917	361	5.0	20.37	
Hedge's Dutchmaid ..	" ..	9 Sept. "	523	3.5	20.29	

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, APRIL, 1918.

The Dixie egg plant wins the monthly prize with 139 eggs, while W. Smith leads in the heavy breed with a score of 105. The birds have settled down well. The number of cases of false moults have been so few that they are not worth mentioning. A few birds paled off, but show signs of an early commencement of laying again. Several birds were treated for minor ailments and recovered. There were three cases of broodiness amongst the heavy breeds. Taking things all through, progress appears to be very satisfactory. The weather conditions have been excellent. The following are the individual records:—

Competitors.	Breed.	April.
LIGHT BREEDS.		
*Dixie Egg Plant	White Leghorns ...	139
*Mrs. L. Henderson	Do.	114
*T. Fauning	Do.	104
Progressive Poultry Farm	Do.	104
Harold Fraser	Do.	103
B. Caswell	Do.	101
*Range Poultry Farm	Do.	99
*E. Chester	Do.	95
*Dr. E. C. Jennings	Do.	95
*L. G. Innes	Do.	95
*C. Knoblauch	Do.	93
*O.K. Poultry Yards	Do.	92
*W. Becker	Do.	91
*Geo. Prince	Do.	90
*C. P. Buchanan	Do.	86
*G. W. Hindes	Do.	85
G. Williams	Do.	82
S. Wilkinson	Do.	80
*G. Howard	Do.	76
*G. H. Turner	Do.	74
*Chris. Porter	Do.	71
O. W. J. Whitman	Do.	71
*Thos. Taylor	Do.	70
Mrs. L. F. Anderson	Do.	69
*Oakland Poultry Farm	Do.	67
J. J. Davies	Do.	67
*W. Lyell	Do.	64
H. F. Britten	Do.	61
*Mrs. A. T. Coomber	Do.	63
*Quinn's Post Poultry Farm	Do.	62
*J. W. Newton	Do.	62
*T. B. Hawkins	Do.	61
*E. A. Smith	Do.	60
*J. Zahl	Do.	52
Geo. Trapp	Do.	52
Mrs. A. G. Kurth	Do.	50
*Homalayan Poultry Farm	Do.	49
H. B. Stephens	Do.	44
R. T. G. Carey	Do.	41
*J. M. Manson	Do.	40

EGG-LAYING COMPETITION—*continued.*

Competitors.						Breed.	April.
LIGHT BREEDS— <i>continued.</i>							
B. Chester	...	...	...	...	...	White Leghorns	37
*Rupert Holmes	...	...	...	...	...	Do.	36
P. O. Oldham	...	...	...	...	...	Do.	34
*Mrs. R. Hunter	...	...	...	...	...	Do.	20
A. W. Walker	...	...	...	...	...	Do.	13
Shaw and Stevenson	...	...	...	...	...	Black Leghorns	8
W. A. Wilson	...	...	...	...	...	White Leghorns	3
HEAVY BREEDS.							
*W. Smith	...	...	...	...	...	Black Orpingtons	105
*W. H. Reilly	...	...	...	...	...	Chinese Langshans	95
*A. E. Walters	...	...	...	...	...	Black Orpingtons	92
*Nobby Poultry Farm	...	...	...	...	...	Do.	89
T. Hindley	...	...	...	...	...	Do.	67
*E. F. Dennis	...	...	...	...	...	Do.	51
W. J. Mee	...	...	...	...	...	Do.	51
H. Puff	...	...	...	...	...	Rhode Island Reds	49
*E. Morris	...	...	...	...	...	Black Orpingtons	48
*J. W. Macrae	...	...	...	...	...	Do.	40
*D. Fulton	...	...	...	...	...	Do.	35
E. M. Larsen	...	...	...	...	...	Do.	24
*Mars Poultry Farm	...	...	...	...	...	Do.	12
*R. Burns	...	...	...	...	...	Do.	10
Jas. Fitzpatrick	...	...	...	...	...	Rhode Island Reds	4
*F. A. Claussen	...	...	...	...	...	Do.	0
A. Shanks	...	...	...	...	...	Black Orpingtons	0
Th. W. Lutze	...	...	...	...	...	Do.	0
Total	...	...	...	...	...	...	4,000

* Indicates that the pen is engaged in single hen test.

SINGLE HEN PEN RESULTS.

Competitor.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
Dixie Egg Plant	139
Mrs. L. Henderson	114
T. Fanning	104
Range Poultry Farm	99
E. Chester	95
Dr. Jennings	95
L. G. Innes	95
C. Knoblauch	93
O.K. Poultry Yards	92
W. Becker	91
Geo. Prince	90
C. P. Buchanan	86
G. W. Hindes	85
G. Howard	76
G. H. Turner	74
Chris. Porter	71
Thos. Taylor	70

SINGLE HEN PEN RESULTS—*continued*.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
Oakland Poultry Farm . . .	8	13	21	16	2	7	67
W. Lyell	19	17	16	12	0	0	64
Mrs. A. T. Coomber	9	10	10	6	10	18	63
Quinn's Post Poultry Farm . .	16	16	1	10	18	1	62
J. W. Newton	15	16	1	4	19	7	62
T. B. Hawkins	11	1	18	8	16	7	61
E. A. Smith	0	23	5	17	15	0	60
John Zahl	14	12	3	10	7	6	52
Homalayan Poultry Farm . . .	17	12	6	0	14	0	49
J. M. Manson	21	3	13	1	1	1	40
R. Holmes	17	10	0	2	1	6	36
Mrs. R. Hunter	1	17	0	0	1	1	20

HEAVY BREEDS.

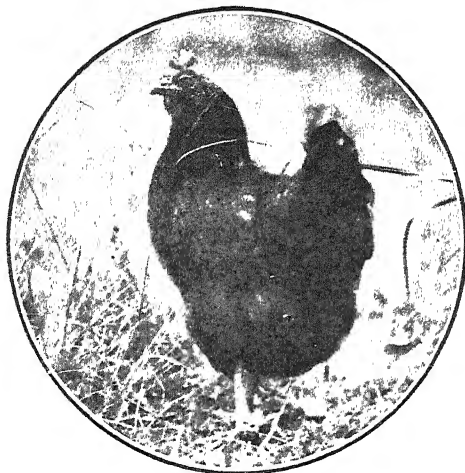
W. Smith	21	24	2	14	20	22	105
W. H. Reilly	23	19	14	12	9	18	95
A. E. Walters	16	17	13	19	20	7	92
Nobby Poultry Farm	21	18	13	6	9	22	89
E. F. Dennis	21	0	7	0	18	5	51
E. Morris	1	16	16	15	0	0	48
J. W. Macrae	0	0	13	0	17	10	40
D. Fulton	3	2	4	2	1	23	35
Mars Poultry Farm	0	0	12	0	0	0	12
R. Burns	0	0	0	0	9	1	10
F. A. Claussen	0	0	0	0	0	0	0

FINAL REPORT OF THE FOURTEENTH EGG-LAYING COMPETITION.

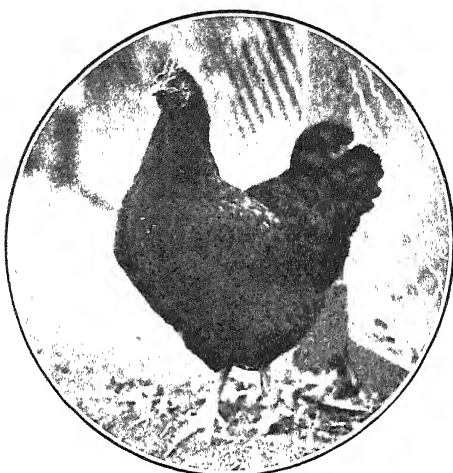
The fourteenth egg-laying competition at the Queensland Agricultural College was concluded on 31st March, 1918. In all, 438 birds competed, 318 in group pens, while the balance of 120 were tested singly. It has again been demonstrated that the group system can in no way compare with the single hen testing, and it is certain that competitors generally will look forward to the time when group pens are a thing of the past.

WEATHER CONDITIONS.

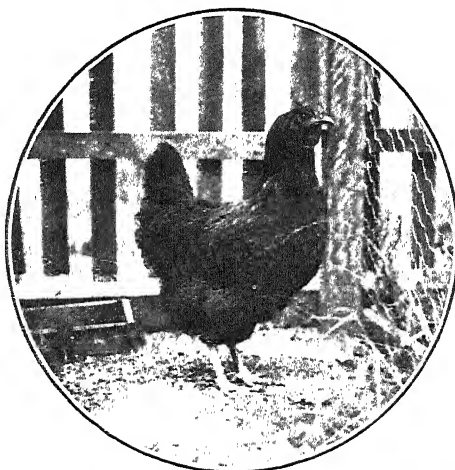
The past year has been very unfavourable. From the beginning of April until the beginning of September conditions were exceptionally dry, heavy westerly winds extending over weeks being characteristic. From September to the end of January we were deluged with excessive rain, which kept the pens sodden and forced the birds to remain in their houses for days at a time. To these exceptional conditions can be attributed the lower total yield.



Mr. R. Burns's "E" Bird.



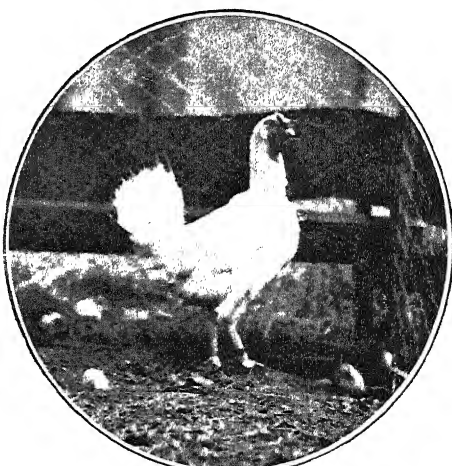
Mr. E. F. Dennis's "D" Bird.



Mr. R. Burns's "F" Bird—335 eggs in 365 days.



Mr. J. M. Manson's "F" Bird.



Mrs. J. R. D. Munro's "A" Bird.

FEEDING.

The quality of the feed used for the birds was, on the whole, very poor. Owing to the pooriness of the pollard, at times it required fully three parts of pollard to one part of bran to get a balanced ration, instead of the usual ratio of two to one. Good pollard seems to be unprocurable, having in some cases a resemblance to fine bran, while in other cases it has a dark colour with an appearance of containing some foreign matter. Dried blood was used for animal food, 5 per cent. being added to the morning mash after the expiration of the first month of the competition, this quantity being increased to 7 per cent. during months when the birds were in full lay. The birds were brought gradually to the blood, as there is a danger of serious harm being caused by feeding to birds that had not received stimulating food prior to entering the competition. It would be advisable that all intending competitors should bear in mind that better results from their birds would be obtained if they kept them on a moderate ration before sending forward. There would not then be the number of birds breaking into partial moults and getting checks. Very little bonemeal was used, as, in our opinion, lime and ash can be fed to the birds in a more digestible form. Four per cent. Sunlight oilcake was fed. No condiments were used, with the exception of a small quantity of spice, which was given during the continuance of the westerly winds and the worst wet weather. Green lucerne and sow thistles were used as green foods, fed to the birds last thing in the evening, and given in sufficient quantity to provide for some being left in the morning, when it was almost as fresh as when given the night before. Soup meat was fed twice a week in the middle of the day; but, unfortunately, it was unprocurable during part of the winter and at a time when the meat would have been most beneficial, if only to give the birds exercise running about with it. Charcoal and shell grit were always before the birds.

GENERAL RESULTS.

The egg production was not satisfactory, the average being the lowest obtained in the College competitions. On the other hand, two records were established. A Black Orpington hen owned by Mr. R. Burns, Sladevale, Warwick, laid 335 eggs in 365 days, while Mr. E. Chester's pen of White Leghorns established a new Queensland record of 1,661 eggs for six hens in 365 days. In both these cases the birds were allowed to continue until 2nd April, so as to complete the full 365 days. It is to be regretted, however, that in both of these cases the birds were disqualified from taking prizes, as the eggs laid were below the standard of 24 oz. to the dozen.

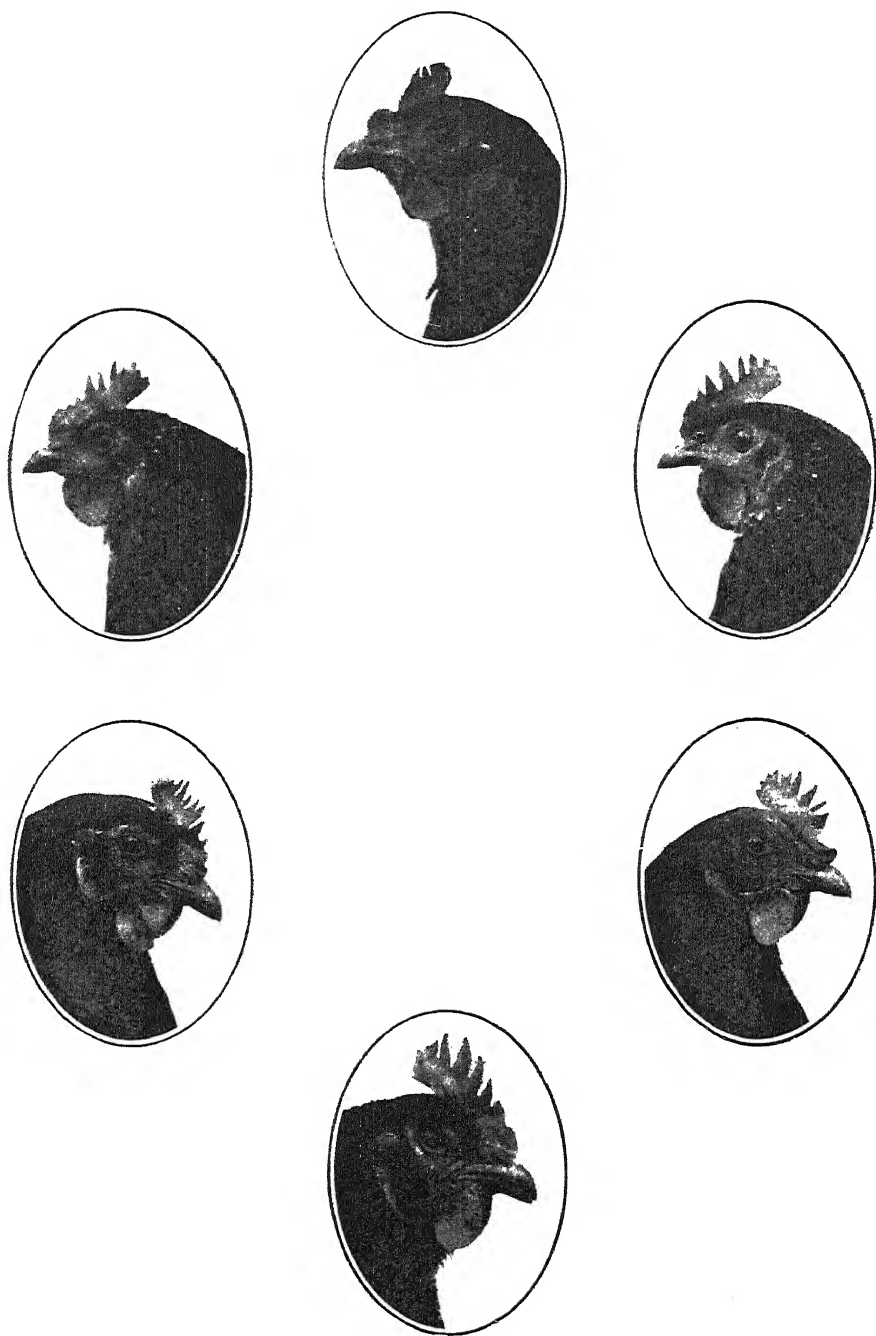


PLATE 20.—THE HEADS OF MR. R. BURNS'S PEN OF BLACK ORPINGTONS.



PLATE 21.—THE HEADS OF MR. E. CHESTER'S PEN.

HEALTH OF STOCK.

Considering the most unfavourable weather the birds had to experience, the general health has been splendid. Only one death resulted from roup, which seems remarkable, when it has to be taken into consideration that the birds were confined to their perches at times for a week at a stretch. Long periods elapsed between the times that the ground was in a fit state for the birds to have a dust bath. There were six cases of consumption or wasting disease. Two, which were also at the same time wasting, died from heat. Six were lost through ovarian trouble, three of which were cases of broken blood vessels through straining on the nest. Two died from enteritis and one from enlarged liver. Total number of deaths, eighteen.

There were several birds which required medical treatment, and these, in some cases, spoiled their owners' chances of gaining a prominent position in the competition. The suggestion of destroying such birds and having them replaced is a matter which should receive attention at the next Queensland Poultry Conference.

BROODIES.

Broodiness has been troublesome throughout the competition. There were 554 cases recorded, the highest number for a group of six hens being 47, while other groups gave 38, 36, 35, 33, 30, 29, 25, 23, 22, and downwards. It is possible that the excessive wet weather may have been partly responsible for the excessive broodiness, for it is quite conceivable that the maternal instinct to brood might have been encouraged under conditions which gave no inducement for the birds to leave the nest for a less favourable position on the perch, while giving them the satisfaction of feeling a number of eggs under them.

WEIGHT OF EGGS.

In the College competition great importance is attached to the average weight of eggs. In conformity with the opinions generally accepted, a standard of 24 oz. to the dozen has been adopted. In August the eggs of birds in the competition were weighed, and, finding that the weights were disastrously low, a second weighing was carried out, as it was thought that the violent windy weather obtaining during the first weighing might have had a lowering influence. But the second weighing confirmed the first results, and at various times since then eggs of some birds and pens have been weighed and showed practically no change over those obtained in August. Thus the weights published have been confirmed, and they disclose a very unfortunate prevalence of small eggs in our various flocks. It certainly is no advantage for eggs

to be too large, but it is equally a disadvantage for eggs to be too small, and we think that breeders could, with advantage to themselves, devote more attention to this side of egg production.

TYPE.

The types of the competing birds were most variable, and show most emphatically that severe steps must be taken to save some of the breeds from losing every resemblance to their standard. Although the utility societies of the Commonwealth have drawn up a standard for utility purposes, there are, however, certain flaws in it that must be rectified for the good of several breeds. A number of competitors seem to be under the impression that, when more size and closer approach to the standard were asked for, what was required was the biggest and often the coarsest birds they could pick up in their yards. The consequences have been—less eggs, more broodiness, bad average, and disappointment.

The full returns of eggs laid, prize lists, and balance-sheet are attached.

WEIGHTS OF EGGS.

The following table of results shows the weight of the eggs to the nearest eighth of an ounce:—

Pen.	Competitor.	Average Weight. Oz.	Pen.	Competitor.	Average Weight. Oz.
1	Miss Hinze	2 $\frac{1}{8}$	28	R. Holmes	2 $\frac{1}{4}$
2	W. Thomas (Quinn's) ..	2	29	W. Becker	2
3	F. W. Leney	1 $\frac{3}{4}$	30	C. P. Buchanan	2
4	Moritz Bros.	2	31	Mrs. Carruthers	2 $\frac{1}{8}$
5	T. B. Hawkins	2	32	G. Williams	2
6	Oakland Poultry Farm..	2 $\frac{1}{4}$	33	Mars P. Farm	2 $\frac{1}{8}$
7	C. Porter	2	34	A. Shillig	2
8	T. A. Pettigrove	2	35	G. Howard	1 $\frac{3}{8}$
9	E. A. Smith	2	36	G. J. White	2 $\frac{1}{8}$
10	C. Knoblauch	1 $\frac{7}{8}$	37	J. H. Newton	1 $\frac{7}{8}$
11	J. Ferguson	2 $\frac{1}{8}$		<i>Heavy Breed:</i>	
12	E. Chester	1 $\frac{7}{8}$	38	H. Jobling	2 $\frac{1}{8}$
13	D. Fulton	2	39	D. Kenway	2
14	G. Chester	1 $\frac{7}{8}$	40	R. Burns	1 $\frac{3}{8}$
15	Mrs. S. J. Sear	2	41	King and Watson	1 $\frac{3}{8}$
16	L. G. Innes	2	42	Mrs. J. H. Jobling	2
17	C. H. Singer	1 $\frac{7}{8}$	43	P. C. McDonnell	2 $\frac{1}{8}$
18	E. Cross	2	44	Cowan Bros.	2
19	J. Holmes	2 $\frac{1}{8}$	45	F. Clayton	2 $\frac{1}{8}$
20	T. Taylor	1 $\frac{7}{8}$	46	C. B. Bertelsmeier	1 $\frac{3}{8}$
21	Kelvin P. Farm	1 $\frac{7}{8}$	47	A. E. Walters	2
22	W. R. Crust	2	48	W. Smith	1 $\frac{7}{8}$
23	J. G. Richter	1 $\frac{7}{8}$	49	E. Morris	1 $\frac{3}{8}$
24	S. C. Chapman	1 $\frac{3}{8}$	50	J. M. Manson	2
25	Mrs. W. D. Bradburne ..	2 $\frac{1}{8}$	51	C. C. Dennis	2
26	A. H. Padman	2	52	W. G. Hansen	2
27	F. Clayton	2	53	F. A. Claussen	2 $\frac{1}{8}$

SINGLE HEN PEN.

No.	Competitor.	A.	B.	C.	D.	E.	F.	Group.
		Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
1	C. C. Dennis	2 $\frac{1}{8}$	2	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	2
2	J. M. Manson	2	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$	2	2
3	Mrs. J. R. Munro	2	2	2	2	2 $\frac{1}{8}$	2	2
4	A. E. Walters	2	2	2 $\frac{1}{8}$	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2
5	G. H. Turner	2 $\frac{1}{4}$	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2	2
6	J. Zahl	2	2 $\frac{1}{4}$	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2	2	2
7	J. R. Wilson	2	2	2 $\frac{1}{4}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	2	2
8	T. Fanning	2	2	1 $\frac{7}{8}$	2	2 $\frac{1}{8}$	2	2
9	Dixie Egg Plant	2	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	..	2
10	Dr. Jennings	1 $\frac{3}{8}$	2	1 $\frac{3}{4}$	2	2	2	1 $\frac{7}{8}$
11	A. W. Bailey .. ..	..	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$
12	A. T. Coomber	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	2	2 $\frac{1}{8}$	2	2
13	Mars P. Farm	2	1 $\frac{1}{8}$	2	2	1 $\frac{3}{4}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$
14	E. A. Smith	1 $\frac{7}{8}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2 $\frac{1}{4}$	2	2
15	R. Burns	2 $\frac{1}{4}$	2	2 $\frac{1}{4}$	2	2 $\frac{1}{8}$	1 $\frac{3}{4}$	2 $\frac{7}{8}$
16	Kelvin P. Farm	1 $\frac{3}{4}$	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$
17	Miss Hinze	2 $\frac{1}{8}$	2	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2
18	F. F. Dennis	1 $\frac{7}{8}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	2	1 $\frac{7}{8}$
19	Oakland P. Farm	1 $\frac{3}{4}$	1 $\frac{3}{4}$	2	..	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$
20	F. W. Leney	1 $\frac{7}{8}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2	2 $\frac{1}{8}$	2

TRUE TO TYPE.

The following pens were declared ineligible for the True to Type prizes:—

H. Jobling, N.S.W. .. ..	..	..	Black Orpingtons
F. Clayton, N.S.W. .. ..	..	..	Rhode Island Reds
R. Burns .. ..	..	..	Black Orpingtons
T. B. Hawkins .. ..	..	..	White Leghorns
T. A. Pettigrove .. ..	..	..	Do.
C. Knoblauch .. ..	..	..	Do.
D. Fulton .. ..	..	..	Do.
W. R. Crust .. ..	..	..	Do.
T. Taylor .. ..	..	..	Do.
C. C. Dennis .. ..	..	..	Do.
J. Zahl .. ..	..	..	Do.
W. Bailey .. ..	..	..	Do.

PRIZE MONEY ALLOTTED.

LIGHT BREEDS.

C. H. Turner—							£	s.	d.	£	s.	d.
Divided first and second general aggregate .. .. .	..	..	..	..	..	..	3	13	6			
Divided first and second true to type aggregate .. .. .	..	..	..	..	..	..	2	12	6			
Second winter test .. .. .	..	..	..	..	..	..	2	2	0			
Third single test .. .. .	..	..	..	..	..	..	1	1	0			
							<hr/>			9	9	0
J. M. Manson												
Third general aggregate .. .. .	..	..	..	..	..	..	2	2	0			
Third true to type aggregate .. .. .	..	..	..	..	..	..	1	1	0			
First single test .. .. .	..	..	..	..	..	..	3	3	0			
Monthly prizes—June, Sept., Oct., Nov., Dec. .. .. .	..	..	..	..	..	..	2	12	6			
							<hr/>			8	18	6
W. Becker—												
Divided first and second general aggregate .. .. .	..	..	..	..	..	..	3	13	6			
Divided first and second true to type aggregate .. .. .	..	..	..	..	..	..	2	12	6			
Third winter test .. .. .	..	..	..	..	..	..	1	1	0			
							<hr/>			7	7	0
E. Chester—												
First winter test .. .. .	..	..	..	..	..	..	3	3	0			
Monthly prizes—April, May .. .. .	..	..	..	..	..	..	1	1	0			
							<hr/>			4	4	0
Mrs. J. R. D. Munro, second single test .. .. .	..	..	..	..	..	..	2	2	0			
Miss M. Hinze, monthly prize, July .. .. .	..	..	..	..	..	..	0	10	6			
C. Porter do. August .. .. .	..	..	..	..	..	..	0	10	6			
W. R. Crust do. January .. .. .	..	..	..	..	..	..	0	10	6			
Mrs. Bradburne do. February .. .. .	..	..	..	..	..	..	0	10	6			
J. R. Wilson do. March .. .. .	..	..	..	..	..	..	0	10	6			

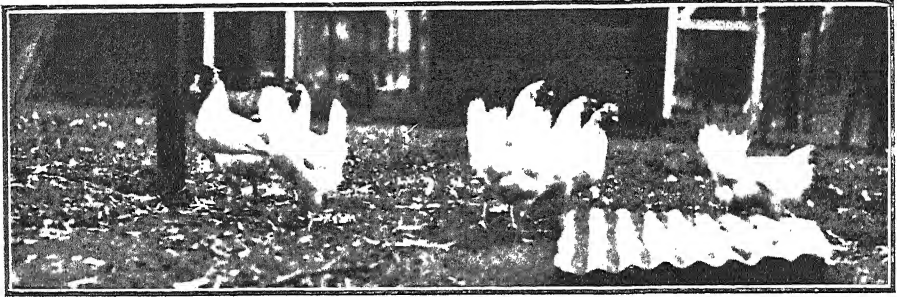
HEAVY BREEDS.

R. Burns—									
First general aggregate	..	..	..	..	..	4	4	0	
First winter test	..	..	..	..	..	3	3	0	
First and second single test	..	..	..	..	..	5	5	0	
Monthly prizes—Oct., Nov., Dec., Jan., March	..	..				2	12	6	
									15 4 6
A. E. Walters—									
Second general aggregate	..	..	..	..	..	3	3	0	
Second true to type aggregate	..	..	..	..	..	3	3	0	
Second winter test	..	..	..	..	..	2	2	0	
Monthly prizes—April, Aug. (half)	..	..	..	..	..	0	15	9	
									9 3 9
W. G. Hansen—									
Third general aggregate	..	..	..	..	..	2	2	0	
Second true to type aggregate	..	..	..	..	..	2	2	0	
									4 4 0
E. A. Smith—									
Third true to type aggregate	..	..	..	..	..	1	1	0	
Monthly prizes—Aug. (half), Sept., Feb.	..	..	..	..	..	1	6	3	
									2 7 3
W. Smith, third winter test	..	..	..	..	..				1 1 0
Mars Poultry Farm, third single test	..	..	..	..	..				1 1 0
F. A. Claussen, monthly prize, May	..	..	..	..	..				0 10 6
E. F. Dennis do. June	..	..	..	..	..				0 10 6
E. Morris do. July	..	..	..	..	..				0 10 6
Total Prize Money..	..	..	..	..	..				£69 6 0

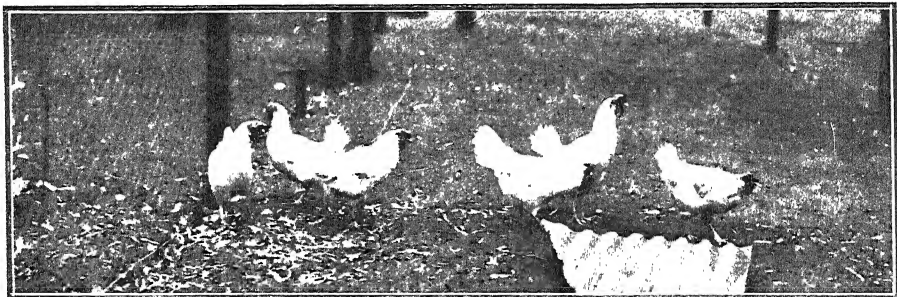
Competitors.	Breed.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	Total.
Lacart Bureaus.														
E. Chester ..	W. Leghorns	118	121	122	129	149	153	155	139	154	144	130	138	1,652
G. Chester ..	ditto ..	104	91	74	128	137	145	147	141	115	123	103	78	1,386
W. Becker ..	ditto ..	91	119	97	117	131	145	139	120	122	99	98	107	1,366
*G. H. Turner ..	ditto ..	73	103	127	128	132	142	133	120	111	100	98	99	1,366
*J. H. Manson ..	ditto ..	5	71	137	143	127	159	161	138	137	71	95	104	1,348
W. R. Crust ..	ditto ..	104	83	92	124	128	133	132	127	127	122	92	79	1,343
Oakland Poultry Farm	ditto ..	75	109	104	110	116	133	142	136	135	116	94	73	1,343
T. Taylor ..	ditto ..	79	83	97	110	128	133	140	123	124	103	97	108	1,316
F. W. Loney ..	ditto ..	44	105	100	142	143	140	140	128	125	97	73	67	1,301
D. Fulton ..	ditto ..	68	39	90	125	137	138	135	122	128	109	107	103	1,301
Kelvin Poultry Farm	ditto ..	17	70	120	133	138	141	149	141	109	110	89	78	1,295
*J. R. Wilson ..	ditto ..	108	60	85	116	117	126	132	125	130	90	76	112	1,277
*A. T. Coomber ..	ditto ..	50	76	101	114	129	130	139	135	127	89	80	79	1,258
Chris. Porter ..	ditto ..	72	69	102	143	145	140	127	114	87	80	75	84	1,248
T. A. Pettigrove, Vic.	ditto ..	64	106	96	123	126	135	135	122	113	70	80	88	1,231
*J. Zahl ..	ditto ..	72	90	104	111	111	135	127	114	105	73	71	75	1,207
Moritz Bros., S.A.	ditto ..	16	94	133	136	135	134	124	94	110	106	87	58	1,186
J. G. Richter ..	ditto ..	63	63	98	120	120	134	116	104	105	88	90	77	1,180
T. B. Hawkins ..	ditto ..	86	86	75	114	126	113	147	131	116	70	66	107	1,178
*Dixie Egg Plant ..	ditto ..	12	88	90	118	106	127	98	89	123	94	102	91	1,178
C. Knolblanch ..	ditto ..	44	89	101	97	126	124	139	121	126	87	101	96	1,164
Mrs. S. J. Sear ..	ditto ..	65	24	25	110	132	138	137	119	118	72	76	63	1,164
*Mrs. J. R. D. Munro	ditto ..	30	88	88	113	128	132	137	109	105	83	69	53	1,164
Quinn's Post Poultry Farm	ditto ..	54	33	111	139	133	148	127	121	122	77	75	69	1,157
Mrs. W. D. Bradburne, N.S.W.	ditto ..	67	40	58	98	138	129	136	128	127	75	112	106	1,156
C. H. Singer ..	ditto ..	59	38	33	93	121	131	136	121	122	77	109	106	1,156
J. L. Newton ..	ditto ..	30	35	101	115	127	123	141	131	110	92	83	66	1,154
A. Shillig ..	ditto ..	60	35	107	107	140	140	136	117	92	60	72	66	1,142
J. Holmes ..	ditto ..	19	33	82	114	125	128	135	105	125	105	77	67	1,132
L. G. Innes ..	ditto ..	37	34	80	116	126	131	129	105	107	98	81	87	1,130
A. H. Padman, S.A.	ditto ..	97	80	93	75	111	123	131	115	102	79	64	54	1,124
*A. W. Bailey ..	ditto ..	75	82	92	110	106	114	107	105	110	77	68	75	1,121
Mars Poultry Farm ..	ditto ..	69	78	75	127	122	110	111	108	103	76	65	49	1,093
C. P. Buchanan ..	ditto ..	32	28	71	85	120	135	137	133	120	69	89	62	1,081
F. C. Chapman ..	B. Leghorns	16	22	82	86	140	141	139	118	110	81	85	59	1,079

F. Clayton, N.S.W.	38	58	73	116	124	126	128	112	125	69	53	57	1,076	1,470
E. Cross	76	45	36	87	138	137	143	115	128	89	64	46	1,076	1,470
*T. Fanning	57	82	99	128	142	143	149	126	103	53	38	75	1,074	1,470
G. J. White	6	27	95	118	126	127	134	114	126	85	79	37	1,074	1,470
E. A. Smith	23	33	58	106	124	127	123	119	121	82	80	73	1,069	1,470
Miss M. Hinze	13	60	80	146	101	107	88	112	119	85	80	75	1,062	1,470
J. Ferguson	9	35	70	94	127	135	130	122	119	72	72	74	1,059	1,470
R. Holmes	76	74	60	110	110	120	117	107	81	55	65	77	1,054	1,470
G. Howard	..	34	90	121	137	140	131	107	88	55	65	78	1,046	1,470
Mrs. J. Carruthers	59	32	35	114	124	117	107	100	113	84	70	79	1,034	1,470
G. Williams	58	51	76	95	122	122	116	98	108	62	74	46	1,028	1,470
*A. E. Walters	..	30	103	123	116	124	120	118	102	75	45	48	1,004	1,470
*Dr. E. C. Jennings	12	31	56	91	99	121	135	115	108	91	76	62	997	1,470
*C. C. Dennis	65	94	115	103	109	109	110	102	86	37	..	..	822	1,470
HEAVY BREEDS.														
B. Oryingtons	76	91	116	161	151	149	140	143	132	113	78	120	1,470	1,470
ditto	54	81	113	138	140	145	145	129	138	113	112	120	1,428	1,470
ditto	80	79	90	150	142	149	130	115	110	63	90	99	1,303	1,470
ditto	81	77	93	157	156	133	117	103	119	65	86	90	1,277	1,470
*E. F. Dennis	..	56	120	151	144	139	141	106	114	94	78	74	1,217	1,470
W. G. Hanson	..	39	77	95	147	128	147	122	106	87	72	65	1,183	1,470
*E. A. Smith	1	10	45	152	156	151	131	139	112	82	92	95	1,166	1,470
R. L. Reds	76	101	68	142	133	110	106	105	99	80	80	61	1,161	1,470
B. Oryingtons	64	57	92	114	122	102	111	105	102	76	89	98	1,138	1,470
ditto	26	45	65	143	136	129	138	115	99	97	78	59	1,130	1,470
ditto	74	66	52	111	119	116	116	114	110	88	68	70	1,104	1,470
ditto	11	21	58	138	129	142	101	108	110	90	80	94	1,082	1,470
C. B. Bertelsmeier, S.A.	..	40	60	90	133	132	124	105	87	94	72	62	1,078	1,470
Cowan Bros., N.S.W.	..	38	53	97	131	124	118	110	98	85	80	58	1,073	1,470
P. C. McDonnell, N.S.W.	..	6	32	109	121	112	125	115	106	90	71	81	1,063	1,470
King and Watson, N.S.W.	..	..	11	29	134	146	132	113	103	115	79	69	1,021	1,470
J. M. Manson	..	25	39	38	128	145	129	117	96	94	85	63	1,001	1,470
*Oakland Poultry Farm	..	..	80	141	134	120	99	107	106	81	67	63	1,001	1,470
R. Burns	..	..	..	..	..	..	..	..	..	..	..	..	..	..
*Miss M. Hinze	..	..	..	..	..	..	..	..	..	..	..	..	..	..
B. Oryingtons	..	1	32	141	141	147	125	131	97	92	50	30	987	1,470
ditto	..	..	..	..	..	..	..	..	..	..	..	..	..	..
W. Wyandottes	..	13	27	173	140	121	113	93	106	65	39	86	975	1,470
ditto	..	..	..	..	..	..	..	..	..	..	..	..	..	..
G. C. Dennis	..	24	74	109	116	126	94	98	88	75	83	88	975	1,470
*Kelvin Poultry Farm	..	8	34	28	120	134	94	84	101	66	78	48	934	1,470
Phycanth Rocks	..	..	..	..	..	..	..	..	..	..	..	..	..	..
R. L. Reds	..	10	28	42	78	123	81	90	79	50	778	30	778	1,470
ditto	..	14	80	68	79	116	76	57	58	49	45	42	769	1,470
Totals	3,239	4,194	5,972	8,820	9,375	9,505	9,122	8,313	8,091	6,092	5,057	5,488	83,868	83,868

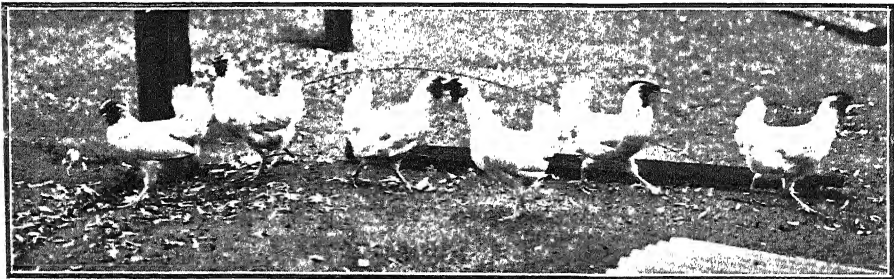
* In the General Returns indicates that the pen is taking part in the Single Hen Test.



MR. W. BECKER'S PEN OF WHITE LEGHORNS.



MR. W. R. CRUST'S PEN OF WHITE LEGHORNS.



MR. E. CHESTER'S PEN OF WHITE LEGHORNS. (Eggs laid, 1,661; average weight, $1\frac{1}{8}$ oz.)

RETURN FROM SINGLE TEST PENS.

Light Breeds.

—	A.	B.	C.	D.	E.	F.	Totals.
G. H. Turner	178	210	248	262	221	247	1,366
J. M. Manson	229	243	186	178	240	272	1,348
J. R. Wilson	229	203	193	219	209	224	1,277
A. T. Coomber	206	160	250	237	205	200	1,258
J. Zahl	243	110	247	149	247	235	1,231
Dixie Egg Plant	195	217	178	239	127	222	1,178
Mrs. Munro	264	197	144	153	162	244	1,164
A. W. Bailey	36	213	229	227	227	189	1,121
T. Fanning	157	209	187	146	157	218	1,074
A. E. Walters	120	130	182	222	176	174	1,004
Dr. E. C. Jennings	129	118	207	189	220	134	997
C. C. Dennis	176	89	77	154	162	164	822

Heavy Breeds.

R. Burns	204	195	267	193	277	334	1,470
Mars Poultry Farm	220	255	232	234	249	238	1,428
E. F. Dennis	233	231	201	277	239	36	1,217
E. A. Smith	193	201	171	218	196	187	1,166
Oakland Poultry Farm	220	136	144	124	233	144	1,001
Miss M. Hinze	161	136	130	181	185	194	987
Kelvin Poultry Farm	137	143	160	211	106	177	934
F. W. Leney	133	165	118	115	114	133	778

BALANCE-SHEET.

RECEIPTS.

	Dozen.	£	s.	d.	£	s.	d.
Entry fees .. ..	..	..	..	..	83	0	0
Sales eggs—							
Defence Department	3,595½	201	8	3			
Barnes and Co.	735½	25	19	1			
Orient S.S. Co.	158½	9	4	11			
Sundry Sales	151½	8	1	1			
College Dining-hall	2,348½	136	18	1			
					381	11	5
Total .. ..	..	..	..	..	464	11	6

EXPENDITURE.

	Bushels.	£	s.	d.	£	s.	d.
Prize Money .. ..	..	..	..	..	69	6	0
Food—							
Wheat	296	63	17	8			
Maize	42	6	10	0			
Hulled Oats	15	5	9	9			
Skinless Barley	9	5	14	0			
Pollard	420	28	17	2			
Bran	196	9	10	1			
	Cwt.						
Oilcake	4	2	3	5			
Desiccated Meat	2	1	4	0			
Bonemeal	1½	0	19	3			
Dried Blood	4½	3	4	0			
Green Lucerne, valued at .. ..	..	2	0	0			
Soup Meat, valued at .. ..	..	3	0	0			
					132	9	4
Balance .. ..	..	..	..	..	262	16	1
Total .. ..	..	..	..	..	464	11	5

CUTHBERT POTTS,
Principal.

Apiculture.

THE COTTON PLANT AS A FACTOR IN BEE-FARMING.

Writing on this subject in the "Apicultural Journal," Mr. Daniel Jones says:—"A hitherto unsuspected addition to the bee forage of the State has recently—through the medium of an American journal, in directing attention to the merits of the cotton shrub for this use—come into prominence. The renowned American authority quoted avers that hardly in an experience of over twenty years has the cotton honey harvest failed him. From reports gathered we learn that the American beekeeper regards this source of honey with greatest appreciation, and depends largely on this for his profits. The old cotton-growers, who in former years had an intimate acquaintance with this industry when it was the biggest farm crop produced in this State, appear to have completely overlooked this source of revenue, inasmuch as no notice is known to have been taken of this fact, although there were many beekeepers at that time engaged in the business. Much as the American appreciates the value of cotton as a source of profit, here in Queensland we have incomparable advantages compared with our American cousins. In the United States cotton belt the shrub blooms for about four to five months in the season; here it will blossom for at least seven months, and carry a much larger number of flowers than is the case in American plantations.

"Judging from the character of our Mascot types of cotton, which bear a very large blossom, and to all appearance contain a larger proportion of pollen than do the herbaceous varieties, we, in this way, should reap an additional advantage.

"Growing the shrub as a perennial plant is not much understood in the cotton belt of the United States, for the reason that frost terminates its growth, which is not always the case in Queensland. I have at present, in my yard at Petrie terrace, a shrub which has been now eleven years bearing, and is furnishing a honey source which would make a beekeeper's eyes glisten. An ordinary plant of the annual type would in a season hardly produce over fifty blossoms. With the perennial types hundreds of blooms will open, from which (as in evidence daily) the busy bee makes good use of her opportunity.

"As a new factor in land settlement this combination of bee-farming, in conjunction with cotton-growing, should have close attention from all interested in either soldier or civilian settlement.

"Cotton is almost an unfailing source of bloom, despite drought or other adverse circumstances. I know of no plant so hardy and so adaptable to our climatic conditions. No settler need fear failure if he goes on a farm where he can raise cotton, honey, and sheep.

"The beekeeper who elects to grow the cotton plant will find it a business not nearly so hazardous as often described.

"Leaving out of question the value of the plant as a bee pasture, which the American authorities evidently appreciate as an auxiliary to ordinary beekeeping, it merits some consideration.

"There are, no doubt, some periods of dearth in bee-farming as in all other rural pursuits, which must be provided for. If the apiarist has a few acres of cotton in his neighbourhood, be they his own or not, some considerable advantage thus accrues. If, however, the plants belong to the bee-man, and his leisure from bee work is assured, and time hangs, it will be a pleasant change to fix up the picking-bag and try his prentice hand on the job. For the first few days he will have sore back and resent the work, but on calculating the compensation in money value he will then be more reconciled, particularly if at the time when his bees are not coining money for him. It costs but a half-penny per pound or less to grow a pound of cotton in seed, and this past season growers have realised 3½d.* so if a picker

* In the boom days, from 1866 to 1873, when the exports of cotton from Queensland were represented by millions of pounds, farmers put large portions of their land under cotton, for which the highest price paid locally was 3d. per lb. [Ed. "Q.A.J."]

gathers anything from 80 to 100 lb. a day, his added wealth stands at from 20s. to 25s. for his day's task. And as his plants will remain in bearing for several years, the annual cost of resowing is obviated, only the small cost of the usual attention in clearing weeds requiring to be met for two or three months of the season, as the plants soon grow sufficiently high and bushy to smother weed growth.

"This is not to be a writing on cotton culture, so I must leave it at this, trusting that as the subject is ventilated in your columns, beekeepers will find some advantage in diversifying their rural work in the direction indicated.

"The best sowing period in the South is from September to November. It can, however, be sown during December in localities not subject to early frost.

"Plants should be spaced 3 feet 6 inches to 4 feet apart in straight lines, so that cross cultivation can be carried on expeditiously.

"In rich soil two plants may be left growing together, otherwise one plant alone is advised. The maturing period from seed to flower of herbaceous plants of the Upland variety is 80 to 90 days; Sea Island, 100 to 110 days. From flower to maturity, Upland sorts, 70 to 80 days; Sea Island, 80 days. Mean daily temperature best adapted to the cotton shrub is 60 to 78 degrees. An increasing daily temperature is necessary for producing the best quality fibre.

"Our Mascot varieties, now long acclimated in Queensland, are very hardy, and have a good-class fibre. However, they are slow in maturing their crop, hence this factor should be taken into account if sowing this type. Generally speaking, this variety will not give a satisfactory crop under twelve months, and in cases even longer, while the herbaceous sorts crop in four months or so after planting."

COTTON AS A HONEY PRODUCER.

Considering the increased attention that is now being paid to the question of cotton-growing, we ("Queensland Apicultural Journal") have been anxious to know whether this plant might be claimed as another source of revenue to the Queensland honey-producer. Our minds have now been set at rest by the perusal of a recent editorial on the subject in the "Beekeepers' Item," a bright little journal, published in Texas, U.S.A., by Louis H. Scholl, one of America's most practical honey-producers. The article which we quote here should give us a heightened appreciation of the cotton bush—a plant that produces raiment to wear, the finest of food to eat, and one of the essentials in winning the war—guncotton.

"Cotton is one of the most remarkable honey plants. On account of the drought its growth was very much retarded throughout a big part of the cotton belt. Much of it not larger than 6 inches in height, regular "humble bee cotton," as it is often called then. After yielding a little honey in the latter part of June and in July, the drought became so severe that it stopped growing altogether, and although almost destroyed in many instances late rains revived it to such an extent that we succeeded in getting a nice cotton honey crop from it before the freezes killed it in October. This was the first year during our twenty-five years' beekeeping experience that this source did not yield a bountiful harvest of honey."

OF INTEREST TO VITICULTURISTS.

On another page of this issue of the Journal will be found amongst the "Departmental Announcements" a notice that cuttings of hybrid grape-vine stocks may be obtained on application to the Under Secretary, Department of Agriculture and Stock. These vines, it should be noted, are not to be grown for fruit, but for purposes of grafting on to other varieties of grapes. The value of these cuttings is that they are practically immune from the attacks of the phylloxera vastatrix or vine louse, which appeared once some years ago in the East Moreton District, and threatened to spread to other portions of the State. Happily the Department took prompt measures to avert such a calamity, and with such success that nothing has since been heard of the terrible pest. It does not, however, follow that our vineyards will never suffer from this cause again, but to be forearmed against such a possibility, the planting of resistant vines is earnestly advised, and such are those which are now to a limited extent available to vigneron and others who have small areas of grape-vines.

Botany.

RECORDS OF A FEW ALIEN PLANTS (*).

By C. T. WHITE, Government Botanist.

Cajanus indicus, Linn. Pigeon Pea. (Order Leguminosae.)

Met with as a stray along the Goondi road, Innisfail. *H. G. Ladbrook*. Native of India.

Foeniculum vulgare, Gaertn. Fennel. (Order Umbelliferae.)

Met with as a stray from garden culture, Blackall Range, April, 1918. Native of Central and Southern Europe and Western Asia.

Artemisia scoparia, Woldst. and Kit. (Order Compositae.)

Met with as a stray from garden culture, Blackall Range, April, 1918. A native of Eastern Europe, Western Asia, and India.

Ipomaea coccinea, Linn. (Order Convolvulaceae.)

Mr. Power, Warden, Cooktown, in sending specimens of this plant to the Deputy Chief Inspector of Stock, Townsville, wrote, 29/6/1916—

“A few days ago, when visiting the Bloomfield River, I was informed that several horses of different owners had died lately. Inquiry elicited the idea that death was most probably caused by the horses eating a small vine or creeper commonly known as ‘Star of Bethlehem,’† and grown in flower gardens. It luxuriates in this locality and covers vast areas. The horses are apparently very fond of it; they begin at the tender tops and gradually eat the vine to the tough fibrous end. This causes a stoppage in the bowels, and soon prevents the animal passing any dung, and causes great pain and straining. Mr. Pierce told me that he lost an entire, the horse, after great straining, passing a large piece of stuff about 15 inches or more in length, and shaped like a sausage. He was given about half a pint of castor oil, but died during the night. Mr. Pierce opened the horse and found the paunch filled with a mass of fibrous matter. I am sending you a sample of the creeper, which is no doubt spreading to a very great extent in that locality. It does not affect cattle in the same way, probably because they chew the cud.”

Apart from other interest, the record is interesting as, though specimens have been sent in from time to time from different localities, I have never previously seen or heard of the plant spreading to any extent. It is a native of tropical America.

Physalis ixocarpa, Brot. Purple Gooseberry. (Order Solanaceae.)

Annual, stem at first erect, later widely spreading and much branched, glabrous or the young shoots slightly hairy. Leaves 1 to 2½ inches long, ovate, margins entire or sinuately dentate. Peduncles (flower-stalks) short. Calyx slightly pubescent, lobes shorter than the tube. Corolla yellow with a purple throat, ½ to ¾ inches across. Fruiting calyx round or round-ovoid, sometimes purple-veined, filled by the purple berry which usually bursts it. Berry purple when ripe, and of an average size of 1 inch in diameter. A native of tropical America, cultivated for the sake of its edible fruits; it has established itself as a common naturalised weed in the Killarney district and probably in other localities.

* See also “Queensland Agric. Journ.,” Vol. VIII., n.s., pp. 269-270, 1917.

† *Ipomaea coccinea* is not the plant known as “Star of Bethlehem,” which is *Ipomaea quamoclit*, but is very closely related to it; and a hybrid between the two species, known as “American Jasmine,” is not an uncommon plant in gardens.

Entomology.

PREDACEOUS ENEMIES OF THE SUGAR-CANE AND THEIR PARASITES.

The General Superintendent of Sugar Experiment Stations has received the following report from the Entomologists to the Bureau, Dr. J. F. Illingworth and Mr. Edmund Jarvis:—

“Investigations regarding the influence of cultural methods on the cane-grub problem look promising on the whole, although at present it is rather early to make definite statements in this connection. Such operations, however, as scarifying or ploughing deeply enough to destroy egg-chambers of the beetle and to occasion mechanical injuries to the young grubs or expose them to great solar heat and to the attacks of birds and other enemies cannot fail to be beneficial. We are inclined to favour an adoption, whenever practicable, of the following cultural measures:—

- (1) Cultivation of the cane during summer weather followed immediately by ploughing such areas.
- (2) Late planting and persistent cultivation during the period of oviposition and a few weeks subsequent to the disappearance of the beetles.
- (3) Ploughing or fallowing land in December.
- (4) Having the ground densely covered with Mauritius beans during the flight of the beetles.

“In support of the above-mentioned procedures it may be stated that certain areas under cane at Greenhills and elsewhere which were planted in December appear flourishing at present, while adjoining land planted earlier is already badly grub eaten.

PREDACEOUS ENEMIES.

“Since reporting last month a little data has been obtained respecting the habits of bandicoots. In the intestines of a specimen recently dissected at the laboratory the skins of several cane-grubs (*L. albobirtum*) were found, together with a wire-worm and many chitinous fragments of coleopterous and other insects. Although this animal is credited with being omnivorous, no vegetable remains were apparent, and judging by the structure of the mouth and its forty-eight sharp teeth, it certainly seems improbable that bandicoots, as some assert, damage cane stools by gnawing the roots and young stalks.

“The small animal alluded to in previous reports as preying on grubs of *L. frenchi* is probably a species of *Phascogale*, it having been described to us as being about the size of a small rat, but with head and mouth resembling those of a bandicoot. We hope to trap and cage some specimens of this little marsupial with a view to observing its habits and dietary.

PARASITISM.

“Since reporting last month, information received from the Queensland Museum renders it necessary to state that the scientific name of our common digger-wasp, hitherto known to Australian entomologists as *Dielis formosa*, has recently been changed by R. E. Turner, of the British Museum, to *Campsomeris tasmaniensis*, Sauss. It appears that the true *formosa*, which occurs at Kuranda and elsewhere and is not unlike *C. tasmaniensis* in form and general colouration, does not range south of Cairns. We have not met with this species at Gordonvale. In the absence of literature relating to the question, we have naturally followed the lead of other scientists in supposing our familiar digger-wasp to be identical with *Scolia* (*Dielis*) *formosa* of Guérin.

“During the past month attention has been given to the rearing of parasites in order to obtain scientific data with regard to their life history and economy, and to determine the best method of breeding extensively and handling them in large numbers.

“This branch of research work has been very successful, and in the event of parasitic insects being introduced into Queensland from other countries in the near future to cope with our cane grubs we are now in a position to make the best use of such material.

"The following brief account of the mode of wasp-propagation practised at Meringa may be of interest to growers:—

"Digger parasites were confined separately in metal cages holding about 15 cubic inches of soil, the grubs with attached eggs being removed morning and evening and placed into cells formed in moist compacted earth that had been previously pressed into shallow wooden trays. A convenient size of tray was found to be 16 by 13 inches, which allowed room for sixty cells, and when full they were stacked up so that the bottom of each tray acted as a roof for that below, and left just enough space to allow the larvæ to spin their cocoons. At the present time (12th April) about 750 specimens of egg, larval, and pupal stages of our two principal digger-wasps may be seen at Meringa Experiment Station.

"We wish to emphasise the fact that the cane-grubs victimised by both *Campsomoris radula* and *tasmaniensis* are chiefly those of the notorious grey-back beetle. Additional hosts affected by these parasites include *Anoplognathus boisduvalli*, *Lepidiota frenchi*, *rothei*, and *caudata*.

"The hundreds of grubs victimised at the insectary during this month (March) are third stage *albohirtum* (mealy-back cane-beetle).

GRUBS UNDER BLADY-GRASS.

"Recent data obtained in the field at Meringa indicates that stage III. larvæ of *Lepidiota frenchi* are still feeding in virgin soil overgrown with blady-grass and other cereals. Grubs collected hastily from 120 chains of plough-furrows, 4 to 6 inches deep, on clay loam land of the above nature, yielded 107 specimens of third stage *albohirtum*, 128 of the same stage *frenchi*, and a few larvæ of *L. rothei* and other scarabæids of minor importance. The grubs of *frenchi* as a whole are still feeding, but will shortly travel deeper into the ground and form pupil chambers. It is interesting to note that these grubs were derived from eggs deposited in December, 1916, and have therefore been more or less injurious during the past sixteen months."

WHAT AUSTRALIA OWES TO GREAT BRITAIN.

Mr. Denison Miller, Governor of the Commonwealth Bank, makes the following statement:—

"During this season about £100,000,000 will have been distributed to primary producers. It has been possible to market these products only because of arrangements made with the British Government through the Commonwealth Bank. The situation, particularly in regard to prices, would have been very different but for the generosity of the British Government. In fact, it is doubtful whether a market would have been obtainable at all.

"To give a clear understanding of the position, and show the tremendous extent of the benefit Australia has derived from this arrangement, Mr. Denison Miller has given the following particulars:—

1915-16 Wheat Harvest.—British Government advanced in anticipation of shipments, £11,000,000.

1916-17 Wheat Harvest.—British Government purchased 3,500,000 tons of wheat and paid for it before delivery—£26,000,000.

1916-17 Wool Clip.—British Government purchased the greater part of the clip and paid for it before shipment—£25,000,000.

1917-18 Wool Clip.—British Government has purchased the whole of it and is paying before shipment the estimated value of the wool and skins—£45,000,000.

Meat and Rabbits.—British Government has for the past two years purchased the exportable surplus of meat and rabbits, estimated at £7,500,000 per annum, and pays for it immediately on shipment—£15,000,000.

Butter and Cheese.—This season's exportable surplus has been purchased by the British Government, and the producers are being paid immediately it is delivered in store and before shipment—£4,000,000.

"In addition there are many other products which the British Government has purchased, including metals and jams, of which detail figures cannot be given, and Britain in her generosity has paid for a very large quantity of them before they are even shipped from Australia. This, too, in spite of the fact that because of the shipping shortage long delays are bound to occur before delivery can be made.

"Though these figures are incomplete they convey some idea of the extent to which the prosperity of Australia is attributable to the liberality of Great Britain. A sense of obligation cannot but be deeply felt. Every class of the community is laid under a debt of gratitude."

General Notes.

THE COTTON PLANT FROM SEED TO MATURITY.

Uplands, after sowing the seed, will flower in from 80 to 90 days. From flowering to maturity, when picking may commence, 70 to 80 days. Sea Island cotton will flower, after sowing, in from 100 to 110 days, and from flowering to maturity, about 80 days. As a rule, cotton is a crop which may be gathered in from five to six months.

CURING MEAT.

Recipes for curing meat in hot weather are of special interest, and the ones given here have been tried. Meat for curing must be thoroughly cooled, because if the surface of meat comes in contact with salt before all the animal heat is removed, it will have a tendency to shrink the muscles and form a coating on the outside which will not allow the generating gases to escape. Meat should never be frozen when salted, because the brine will not penetrate uniformly, and uneven curing will result. Hams and sides should be trimmed smoothly, care being taken to expose as little lean meat as possible. The meat may be placed in earthenware jars or oak barrels with wooden hoops, since iron hoops will rust.

Good brine for brine-curing can be made from 10 lb. of salt, 2 lb. of sugar or molasses, and 4 gallons of water to 100 lb. of meat. It is a good precaution to boil and skim the mixture. Two or three ounces of saltpetre may be added to preserve the natural colour of the meat, but is harmful to the health even if used in small quantities. Brine does not easily freeze, but meat cures more rapidly if it does not become too cold. The bacon will cure in from twenty-two to thirty days, while the heavier hams need from forty to sixty days. Freshen cured meat in lukewarm water for six hours, then dry and smoke.

For dry curing, make a mixture of clean fine salt, 40 lb.; white or brown sugar, 10 lb.; white or black pepper, 4 lb.; red pepper, $\frac{1}{2}$ lb. This will make enough cure for about 1,000 lb. of pork. If saltpetre is desired, use 2 lb. in the above mixture. Rub each piece of meat thoroughly with the cure, working it in well around the bones of hams and shoulders. Pack with skin down in a box in a cool, airy place, not in direct sunlight nor in a damp, musty cellar. After four or five days overhaul the meat, rub thoroughly with the cure, and repack; repeat this in about a week. Hams and shoulders should remain in the cure from one and one-half to two days per lb. weight of piece; the latter time is safer for meat that is to be kept during the summer. Bacon should be in the cure a shorter time. Ten days will give a very nice mild cure to a 6 or 8 lb. piece.

Any of the mixtures which give good results in curing pork can be used satisfactorily for beef, but beef should not be allowed to remain in the brine or mixture quite so long. Corned beef is best when it has been in the cure about ten days.

Here is the "Farm Journal" recipe for dried beef, used again and again by many of our readers. Try it by all means:—Get the tender side of the round out of a good fat beef. For every 20 lb. of beef take 1 pint of salt, a teaspoonful of saltpetre, and $\frac{1}{2}$ lb. of brown sugar. Mix these well, rolling out any lumps; divide into three equal parts, and rub well into the beef for three successive days. Turn beef daily in the liquor it will make. It should not make much, but what there is rub into and pile on the beef. Rub a little extra salt into the hole cut for the string to hang it by. At the end of a week hang in a dry, rather warm place, till it stops dripping, then in a cooler, dry place. Do not smoke it; it spoils the flavour.

Pickled and cured meats are smoked to aid in their preservation. The smoke seals up the pores, acts as a vermifuge, aids in drying, and adds flavour to the product. The smoke-house should be 6 to 8 feet high for ordinary farm use. Small openings under the eaves, or a chimney on the roof, will provide the essential free circulation. Brick houses are best, but large drygoods boxes and even barrels may be made to serve as smoke-houses where only small amounts of meat are to be smoked.

Sometimes there is trouble in keeping meat after it has been cured or smoked. It should be stored in a dry, cool, and well-ventilated place. If allowed to hang up unprotected it is almost certain to become infested with skippers and be blown with flies. The most satisfactory way to handle the meat is to wrap it up in paper and then enclose in strong muslin sacks, tied tightly at the tops.—"Farm Journal of the U.S.A."

GOOD IDEA FOR A NOSE-BAG.

The "New Zealand Farmer" supplies the following excellent idea for a nose-bag, which should prove of great comfort to horses whose mid-day feed is supplied in a suffocating bag:—

Ever consider the discomforts of a horse compelled to feed with his breathing apparatus buried in a nose-bag full of dusty chaff? asks "Murkah" in the "Bulletin." They must be considerable, especially in hot weather. The other day I saw an idea for giving Dobbin his mid-day bite so superior to the nose-bag that, after the publication of particulars in this paragraph, I confidently expect to see a revolution in horse-feeding methods. Here's the recipe: Get a piece of bagging 2 feet 6 inches or so square. Sew in four pieces of wood round the edges. To one end of two of them attach short straps, and, to the other ends, longer straps. Buckle the short straps to the collar or hames at the height the feed is required, and the longer ones (long enough to let the contraption hang out level) higher up on the same piece of harness. The pieces of wood hold the bag out, and the result is a small feed-trough from which Nugget can extract the last oat without nearly breaking his neck and half-suffocating himself in the process. The driver of the team was enthusiastic about the idea, remarking that as well as being kinder to the horse it was handier in every way than the nose-bag.

TO REPAIR OLD TYRES.

In every garage there is generally a number of worn-out tyres. A strong, serviceable inner patch may be made by using a portion of one of these disused covers. Cut, say, 12 in. from a similar sized old tyre, and remove the lip as in Fig. 1.

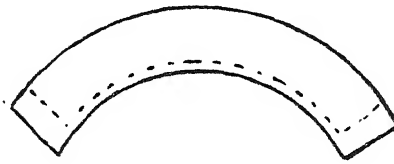


FIG. 1.

Feather at both ends for 1 in., so that the inner tube when inflated will not press on any sharp edge. Procure six bolts and nuts 1 in. x 5-16th in., and six washers to fit same, not less than $\frac{1}{4}$ in., but $\frac{3}{4}$ in. would be better. With a brace and bit, or drill, bore hole (B in Fig. 2) from the outside, first taking care that the patch fits

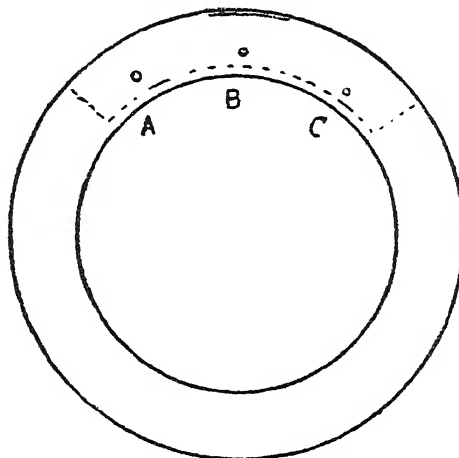


FIG. 2.

as near as you can press it to the inside of the tyre. Pass the bolt, which must have rounded end, through the patch and tyre from the outside, then put on washer and screw the nut on tightly. Proceed in similar way with holes (A and C, Fig. 2). Turn tyre round and proceed in similar way with the other side. When all nuts have been screwed as tight as they will go, cut off ends of bolts with a hack saw or file. Old tyres treated this way have been used for over 1,000 miles.

THE "OXLEY FERTILISER."

Owing to an error in the Advertising Office, the change of prices in Messrs. Foggitt, Jones, and Co.'s advertisement in the May issue of the "Journal" was not noted. The prices fixed for their lines should have read as follow:—"Price per ton, £9. Less than ton lots, 9s. 6d. per cwt." We trust that our readers will accept this explanation, which naturally absolves Messrs. Foggitt, Jones, and Co. from all blame.

EXCAVATED SILOS.

Mr. B. Jewitt, Buderim, writes:—

Re article on silos in the "Agricultural Journal," of April, 1917, this will probably suffice; but will it suffice to induce some of our farmers to rise to the wisdom of our savage ancestors and build silos? No, we need not build silos, but excavate the soil from the face or brow of a hill to any size you like, only it is considerably wider at the top than at the bottom, so that the greenstuff will press at the sides as well as at the middle, and thereby we avoid musty ensilage. It must be covered with some waterproof material.

SOCIETIES, SHOW DATES, ETC.

Atherton.—Atherton Tableland Agricultural Society: Show dates, 18th and 19th September. W. Morris, secretary.

Bowen.—Bowen Pastoral, Agricultural, and Mining Association: Show dates, 29th and 30th August.

Mackay.—Sarina Branch of the Pioneer River Farmers and Graziers' Association. Secretary, W. S. O'Grady.

North Pine.—Pine Rivers Agricultural, Horticultural, and Industrial Association Show (at Lawnton), 21st and 22nd June.

Wellington Point Agricultural, Horticultural, and Industrial Association.—E. Beckley, secretary.

ALTERATION OF SHOW DATES.

The dates of the Show of the Port Curtis Agricultural, Pastoral, and Mining Association have, in order to avoid clashing with other events, been altered from 11th, 12th, and 14th June, to 12th, 13th, and 14th June.

ABOUT MAIZE AND OATS—A WORD TO FARMERS.

The farmer who remembers his early difficulties, his struggle against adverse weather conditions, the trials, tribulations, and disappointments which met him at every turn, will feel the utmost sympathy for the returned soldiers who are being placed on the land. He will know something of the obstacles which these men must overcome, and with his inborn generosity he will be quite ready and willing to lend a helping hand to those who, after fighting in far distant lands, have come back to carve out new homes for themselves and their families in the land of their birth or adoption.

An excellent opportunity now presents itself for growers of maize, oats, or other cereals, which are utilised as feed for poultry to assist. The Poultry Subcommittee of the Queensland Land Settlement Committee has just established a number of settlements for returned soldiers, who are anxious to go in for poultry-raising. Many of these men have already taken over their holdings, which are being stocked with young poultry. The resources of these soldier poultry farmers are naturally very limited, and it will be of very great assistance if farmers and others will make contributions in the form of grain suitable for young poultry. Farmers can help their country and the saviours of their country in a practical way by putting aside a few bags of maize or oats or other grain to be handed to the soldier poultry-raisers.

Secretaries of various farmers' organisations might also take the matter up and organise contributions amongst the members of their organisations.

Those willing to assist should communicate with the Secretary, Land Settlement Committee, Lands Department, Brisbane, when arrangements will be made to take delivery of all contributions of grain and distribute it amongst the various poultry farmers.

TOBACCO SEED.

The Department of Agriculture and Stock has just received from America a supply of tobacco seed (pipe and cigar varieties). These varieties comprise Yellow Pryor (pipe and cigarette), Sumatra (cigar wrapper), Zimmer Spanish (cigar), Improved White Stem Orinoco and Comstock (cigar).

Price, 2s. 6d. per oz., postage paid. Application and remittance should be forwarded to the Under Secretary for Agriculture, Brisbane.

POOK'S PATENT CHAFF BAGGER AND DUMPER.

One of the special features of the Sydney Show was a Pook's Patent Chaff Bagger and Dumper in full operation. Thousands of interested farmers witnessed the demonstration, and the comments made on it were very flattering to the patentee. It is a dumper with the faults left out. Mr. Pook had witnessed the unsatisfactory working of several machines, and decided to experiment to improve them. That he has been successful is clearly demonstrated by the number of testimonials from satisfied users. He started manufacturing at Forest Hill three years ago, but owing to the increased demand for machines it necessitated the removal of the plant to a more central position. He is now in commodious premises in South Brisbane, and a visit to the works shows a number of Queensland workmen using Queensland timber and castings, turning out machines as fast as possible to meet the large number of orders. One of the machine's special features is the feet, which partly revolve after each stroke, thus ensuring an even pressure on the bags at all times.

Anyone in need of a chaff bagger and dumper would have their time amply repaid by first seeing a "Pook" before purchasing any other machine.

MYSTERIOUS DISEASE IN STOCK.

"For a number of years, cattle have been dying on certain holdings in the Horton end of the district, from a mysterious disease. The Stock Inspector, Mr. H. W. Copeland, has lately held a *post-mortem* examination, with the result that the cause has been found to be parasitical gastritis, which is brought about by the infestation of small round worms that are invisible to the naked eye. The symptoms of the disease are the gradual wasting away of the animal, profuse scouring, and a watery gathering or dropsical swelling about the throat. There is also a general anæmic appearance, and eventually the animal becomes so weak that it dies. The animals affected are from twelve months to two years old. The Inspector advises a plentiful supply of block salt, and dosing them with a solution that can be had on application at the office of the Stock Inspector."

The above is an extract from the local paper. In mentioning block salt, Inspector Copeland evidently refers to "Leslie Salt Licks," which are known in the U.S.A. as "block" or "brick" salt because they are manufactured in the shape or form of a block or brick.

There is no other salt put up in the same convenient way. "Leslie" Salt Licks are fitted with loops for hanging to post, rail, or manger. They cannot absorb the germs and filth which are so common round the usual rock salt dump.

Graziers, pastoralists, dairymen, and horse owners will be interested to learn that Stock Inspectors are now recommending "Leslie" Salt Licks where cattle and sheep disease are prevalent.

Answers to Correspondents.

THE MANAGEMENT OF DUCKS.

Owing to pressure of space, our article on the Management of Ducks is unavoidably held over until next month.

WORK OF A SAW-GIN.

"COTTON-GROWER," Ipswich—

A good 50-saw gin will turn out from 1,000 to 1,500 lb. of lint per day of ten hours, in America. Working eight hours per day, as in this State, the output would be from 800 to 1,200 lb. per day. It would not pay to set up a ginnery on a 50-acre cotton farm. If a number of growers in the same district would plant large areas, say from 10 to 50 acres, they might co-operate to establish a ginnery, and so make it a paying concern.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR MAY, 1918.

Article.								MAY.
								Prices.
Bacon	...	...	...	...	...	...	lb.	9d. to 10d.
Barley	...	...	...	...	...	...	bush.	3s. 5d.
Bran	...	...	...	...	...	...	ton	£6 15s.
Broom Millet	...	...	...	...	...	...	"	£35 to £45
Butter (First Grade)	...	...	...	...	...	...	cw.t.	128s. 6d.
Chaff, Mixed	...	...	...	...	...	...	ton	£3 10s. to £5
Chaff, Oaten (Imported)	...	...	...	...	...	...	"	£7 10s.
Chaff, Lucerne (Local)	...	...	...	...	...	...	"	£6 10s. to £7 10s.
Chaff, Wheaten	...	...	...	...	...	...	"	£1 to £5 10s.
Cheese	...	...	...	...	...	...	lb.	7½d. to 10½d.
Flour	...	...	...	...	...	...	ton	£12
Hams	...	...	...	...	...	...	lb.	1s. 3d. to 1s. 10d.
Hay, Oaten	...	...	...	...	...	...	ton	...
Hay, Lucerne	...	...	...	...	...	...	"	£5 to £5 6s.
Hay, Wheaten	...	...	...	...	...	...	"	£4 to £5 10s.
Honey	...	...	...	...	...	...	lb.	3½d. to 4d.
Maize	...	...	...	...	...	...	bush.	4s. to 4s. 6d.
Oats	...	...	...	...	...	...	"	4s. 6d.
Onions	...	...	...	...	...	...	ton	£8 10s. to £10
Peanuts	...	...	...	...	...	...	lb.	3½d. to 4d.
Pollard	...	...	...	...	...	...	ton	£7 5s.
Potatoes	...	...	...	...	...	...	"	£1 6s. to £7 15s.
Potatoes (Sweet)	...	...	...	...	...	...	"	£2 5s. to £3 10s.
Pumpkins (Cattle)	...	...	...	...	...	...	"	£3 5s. to £3 15s.
Eggs	...	...	...	...	...	...	doz.	1s. 10d. to 2s. 6d.
Fowls	...	...	...	...	...	...	per pair	3s. to 7s. 3d.
Ducks, English	...	...	...	...	...	...	"	2s. 9d. to 3s. 9d.
Ducks, Muscovy	...	...	...	...	...	...	"	5s. 6d. to 6s.
Geese	...	...	...	...	...	...	"	6s. to 6s. 6d.
Turkeys (Hens)	...	...	...	...	...	...	"	8s. to 9s. 6d.
Turkeys (Gobblers)	...	...	...	...	...	...	"	12s. 6d. to 20s.
Wheat (Milling)	...	...	...	...	...	...	bush.	3s. 9d. to 4s.

VEGETABLES—TURBOT STREET MARKETS.

Beans, per sugar-bag	...	...	...	...	...	...	6d. to 2s. 8d.
Beetroot, per sugar-bag	...	...	...	...	...	...	6d. to 9d.
Cabbages, per dozen	...	...	...	...	...	...	1s. to 4s. 6d.
Carrots, per sugar-bag	...	...	...	...	...	...	2s. 6d. to 5s.
Cauliflowers, per dozen	...	...	...	...	...	...	13s. to 17s. 6d.
Chokos, per case	...	...	...	...	...	...	1s. to 1s. 3d.
Cucumbers, per dozen	...	...	...	...	...	...	1s. to 1s. 6d.
Lettuce, per dozen	...	...	...	...	...	...	1s. to 1s. 6d.
Marrows, per dozen	...	...	...	...	...	...	2s. 6d. to 3s. 6d.
Parsnips, per dozen bundles	...	...	...	...	...	...	6d. to 1s.
Peas, per sugar-bag	...	...	...	...	...	...	6s. to 9s.
Sweet Potatoes, per sugar-bag	...	...	...	...	...	...	2s. 3d. to 3s.
Table Pumpkins, per dozen	...	...	...	...	...	...	6s. to 6s. 6d.
Tomatoes, per quarter-case	...	...	...	...	...	...	2s. to 4s. 6d.

SOUTHERN FRUIT MARKETS.

Article.						MAY.
						Prices.
Bananas (Queensland), per case ...	...	...	...	...	...	9s. to 15s.
Bananas (Tweed River), per bunch ...	...	...	...	...	...	10s. to 12s.
Bananas (Fiji), per case ...	...	...	...	...	...	20s. to 23s.
Bananas (G. M.), per case ...	...	...	...	...	...	20s. to 23s.
Custard Apples, per tray ...	...	...	...	...	...	...
Lemons (local), per bushel-case ...	...	...	...	...	...	...
Mangoes, per case ...	...	...	...	...	...	...
Mandarins, per case ...	...	...	...	...	...	...
Oranges (Navel), per case ...	...	...	...	...	...	...
Oranges (Queensland), per case ...	...	...	...	...	...	7s. to 14s.
Papaw Apples, per half-case ...	...	...	...	...	...	6s. to 7s.
Passion Fruit, per half-case ...	...	...	...	...	...	11s. 0d.
Persimmons, per half-case ...	...	...	...	...	...	2s. to 4s.
Pineapples (Queens), per double-case ...	...	...	...	...	...	10s. 0d.
Pineapples (Ripley) per double-case ...	...	...	...	...	...	7s. to 9s.
Quinces, per bushel-case ...	...	...	...	...	...	...
Tomatoes (Queensland), per half-case ...	...	...	...	...	...	2s. to 4s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.						MAY.
						Prices.
Apples, Eating, per case ...	...	...	...	...	...	7s. 6d to 8s. 6d.
Apples, Cooking, per case ...	...	...	...	...	...	7s. to 9s.
Apricots, per case ...	...	...	...	...	...	...
Bananas (Cavendish), per dozen ...	...	...	...	...	...	1½d. to 5d.
Bananas (Sugar), per dozen ...	...	...	...	...	...	4d. to 5½d.
Cape Gooseberries, per small box ...	...	...	...	...	...	5s. to 5s. 6d.
Cherries, per box ...	...	...	...	...	...	...
Citrons, per hundredweight ...	...	...	...	...	...	8s.
Cocoanuts, per sack ...	...	...	...	...	...	15s. to 25s.
Cumquats, per quarter-case ...	...	...	...	...	...	3s. to 3s. 6d.
Custard Apples, per tray ...	...	...	...	...	...	3s. to 4s.
Lemons (Lisbon), per quarter-case ...	...	...	...	...	...	3s. to 6s.
Mandarins, per case ...	...	...	...	...	...	6s. to 9s.
Mangoes, per quarter-case ...	...	...	...	...	...	...
Oranges (Navel), per case ...	...	...	...	...	...	6s. to 8s.
Oranges (Other), per case ...	...	...	...	...	...	2s. 6d. to 4s. 6d.
Oranges, per case ...	...	...	...	...	...	...
Papaw Apples, per quarter-case ...	...	...	...	...	...	2s. to 4s. 6d.
Passion Fruit, per half-bushel case ...	...	...	...	...	...	4s. to 6s.
Peaches, per quarter-case ...	...	...	...	...	...	...
Pears, per half-bushel case ...	...	...	...	...	...	...
Peanuts, per lb. ...	...	...	...	...	...	3½d. to 4d.
Persimmons, per quarter-case ...	...	...	...	...	...	1s. 8d. to 2s. 6d.
Pineapples (Ripley), per case ...	...	...	...	...	...	9s. to 10s.
Pineapples (Rough), per case ...	...	...	...	...	...	1s. to 3s.
Pineapples (Smooth), per case ...	...	...	...	...	...	4s. 6d. to 5s. 6d.
Plums, per quarter-case ...	...	...	...	...	...	...
Rockmelons, per dozen ...	...	...	...	...	...	...
Strawberries, per dozen boxes ...	...	...	...	...	...	...
Rosellas, per sugar bag ...	...	...	...	...	...	2s. 6d. to 3s. 6d.
Tomatoes, per quarter-case ...	...	...	...	...	...	1s. 6d. to 3s. 3d.

TOP PRICES, ENOGGERA YARDS, APRIL, 1918.

Animal.								APRIL.
								Prices.
Bullocks ...	...	...	...	...	...	...	...	£18 10s. to £23
Cows ...	...	...	...	...	...	...	...	£13 to £15 15s.
Cows (Single) ...	...	...	...	...	...	...	...	...
Merino Wethers ...	...	...	...	...	...	...	...	42s. 3d.
Crossbred Wethers ...	...	...	...	...	...	...	...	38s.
Merino Ewes ...	...	...	...	...	...	...	...	26s. 6d.
Crossbred Ewes ...	...	...	...	...	...	...	...	36s. 3d.
Lambs ...	...	...	...	...	...	...	...	33s. 9d.
Pigs (Baconers) ...	...	...	...	...	...	...	...	...
Pigs (Porkers) ...	...	...	...	...	...	...	...	35s.
Pigs (Slips) ...	...	...	...	...	...	...	...	...

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF APRIL, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING APRIL, 1918 AND 1917, FOR COMPARISON.

Divisions and Stations.		AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.		AVERAGE RAINFALL.		TOTAL RAINFALL.	
		April.	No. of Years' Records.	April, 1918.	April, 1917.			April.	No. of Years' Records.	April, 1918.	April, 1917.
<i>North Coast.</i>						<i>South Coast—continued:</i>					
		In.		In.	In.			In.		In.	In.
Asherton ...	...	4.25	17	4.37	4.85	Nambour ...	...	4.53	22	7.16	2.85
Cairns ...	...	11.74	36	8.23	8.95	Nanango ...	...	1.89	36	1.33	0.42
Cardwell ...	...	9.85	46	7.70	6.04	Rockhampton ...	...	2.24	31	3.38	0.82
Cooktown ...	...	9.40	42	6.32	6.42	Woodford ...	...	4.19	31	2.53	1.13
Herberton ...	...	4.35	31	3.31	3.60						
Ingham ...	...	8.65	26	8.19	7.98	<i>Darling Downs.</i>					
Innisfail ...	...	21.86	37	17.48	13.70	Dalby ...	...	1.32	48	1.13	1.94
Mossman ...	...	11.78	10	6.82	9.78	Emu Vale ...	...	1.17	...	2.77	0.29
Townsville ...	...	3.72	47	2.62	3.25	Jimbour ...	...	1.39	...	1.27	1.24
						Miles ...	...	1.47	33	2.16	0.87
<i>Central Coast.</i>						Stanthorpe ...	...	1.77	45	1.29	0.37
Ayr ...	...	2.76	31	1.84	2.80	Toowoomba ...	...	2.54	46	1.53	1.74
Bowen ...	...	3.04	47	2.27	1.58	Warwick ...	...	1.36	31	3.41	0.06
Charters Towers ...	...	1.73	36	1.02	0.19						
Mackay ...	...	6.80	47	9.25	3.27	<i>Maranoa.</i>					
Proserpine ...	...	6.59	15	8.35	9.44	Roma ...	...	1.30	44	3.17	0.67
St. Lawrence ...	...	2.81	47	7.82	2.17						
						<i>State Farms, &c.</i>					
<i>South Coast.</i>						Bungeworgorai ...	...	0.79	4	2.92	0.28
Biggenden ...	...	1.62	...	3.00	0.39	Gatton College ...	...	1.83	...	1.63	0.53
Bundaberg ...	...	2.79	35	4.81	1.99	Gindie ...	...	1.19	...	2.70	0.04
Brisbane ...	...	3.63	67	1.70	0.75	Hermitage ...	...	1.31	...	3.61	...
Childers ...	...	2.35	23	4.04	1.71	Kairi ...	...	3.47	4	4.08	4.09
Crohamhurst ...	...	5.42	25	5.64	2.63	Kamerunga ...	...	11.98	...	10.26	9.46
Esk ...	...	2.71	31	1.38	1.73	Sugar Experiment Station, Mackay	...	5.13	...	8.42	5.24
Gayndah ...	...	1.31	47	2.07	0.84	Warren ...	...	0.98	4	2.95	0.51
Gympie ...	...	3.09	48	3.17	1.32						
Glasshouse M'tains	...	4.70	10	4.48	2.15						
Kilkivan ...	...	2.10	39	1.99	1.03						
Maryborough ...	...	3.27	47	3.35	1.21						

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for April this year, and for the same period of 1917, having been compiled from telegraphic reports, are subject to revision.

J. H. HARTSHORN, Divisional Officer.

Farm and Garden Notes for July.

FIELD.—The month of July is generally considered the best time to sow lucerne, for the reason that the growth of weeds is then practically checked, and the young lucerne plants will, therefore, not be retarded by them, as would be the case if planted later on in the spring. If the ground has been properly prepared by deep ploughing, cross-ploughing, and harrowing, and an occasional shower occurs to assist germination and growth, the lucerne will thrive so well that by the time weeds once more appear it will be well able to hold its own against them. From 10 to 12 lb. of seed drilled, or 15 to 16 lb. broadcast, will be sufficient for an acre. This is also the time to prepare the land for many field crops, such as potatoes, maize, oats, and barley for green fodder; also, rye, vetches, tobacco, cotton, sugar-cane, field carrots, mangolds, swedes, cannaigre, &c. Early potatoes, sugar-cane, and maize may be planted in very early districts, but it is risky to plant potatoes during this month in any districts liable to late frosts or in low-lying ground. Under such conditions, it is far better to wait until well into the following month. The greatest loss in potatoes and sugar-cane has been, on more than one occasion, experienced in September, when heavy frosts occurred in low-lying districts in the Southern portion of the State. During suitable weather, rice may be sown in the North. The coffee crop should now be harvested, and yams and tumeric unearthed.

KITCHEN GARDEN.—Should showery weather be frequent during July, do not attempt to sow seeds on heavy land, as the latter will be liable to clog, and hence be injurious to the young plants as they come up. The soil should not be reworked until fine weather has lasted sufficiently long to make it friable. Never walk over the land during wet weather with a view to sowing. The soil cakes and hardens, and good results cannot then be expected. This want of judgment is the usual cause of hard things being said about the seedsman. In fine weather, get the ground ploughed or dug, and let it lie in the rough till required. If harrowed and pulverised before that time, the growth of weeds will be encouraged, and the soil is deprived of the sweetening influences of the sun, rain, air, and frost. Where the ground has been properly prepared, make full sowings of cabbage, carrot, broad beans, lettuce, parsnips, beans, radishes, leeks, spring onions, beetroot, eschalots, salsify, &c. As westerly winds may be expected, plenty of hoeing and watering will be required to ensure good crops. Pinch the tops of broad beans which are in flower, and stake up peas which require support. Plant out rhubarb, asparagus, and artichokes. In warm districts, it will be quite safe to sow cucumbers, marrows, squashes, and melons during the last week of the month. In colder localities, it is better to wait till the middle or end of August. Get the ground ready for sowing French beans and other spring crops. Sow Guada beans (snake gourd) at the end of September.

FLOWER GARDEN.—Winter work ought to be in an advanced state. The roses will now want looking after. They should already have been pruned, and now any shoots which have a tendency to grow in wrong directions should be rubbed off. Overhaul the ferneries, and top-dress with a mixture of sandy loam and leaf mould, staking up some plants and thinning out others. Treat all classes of plants in the same manner as the roses where undesirable shoots appear. All such work as trimming lawns, digging beds, pruning, and planting should now be got well in hand. Plant out antirrhinums, pansies, hollyhocks, verbenas, petunias, &c., which were lately sown. Sow zinnias, amaranthus, balsam, chrysanthemum tricolor, marigolds, cosmos, cox-combs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberose, amaryllis, paneratum, ismene, crinum, belladonna, lily, and other bulbs. Put away dahlia roots in some warm, moist spot, where they will start gently and be ready for planting out in August and September.

Orchard Notes for July.

THE SOUTHERN COAST DISTRICTS.

The notes for the month of June apply to July as well. The first crop of strawberries will be ripening during the month, though extra early fruit is often obtained in June, and sometimes as early as May, under especially favourable conditions. Look out for leaf-blight, and spray for same with Bordeaux mixture, also watch for the first signs of the grey mould that attacks the fruit, and spray with the sulphide of soda wash. The larvæ of the cockchafer, that eats the roots of strawberries, should be looked for, and destroyed whenever found. Pruning of citrus and other fruit trees may be continued; also, the spraying with lime and sulphur. Where the ringing borer, that either attacks the main trunks or the branches at or near where they form the head of the tree, is present, the main stems and trunks should either be painted or sprayed with the lime and sulphur wash during the month, as the mature beetles that lay the eggs that eventually turn to the borers sometimes make their appearance during the month, and unless the trees are protected by the wash they lay the eggs, which hatch out in due course and do a lot of damage. Keep the orchard clean, so that when the spring growth takes place the trees may be in good condition. There is usually a heavy winter crop of pineapples ripening during this and the following month, particularly of smooth leaves. See that any conspicuous fruits are protected by a wisp of grass, as they are injured not only by frost but by cold westerly winds.

THE TROPICAL COAST DISTRICTS.

See the instructions given for the month of June. Keep the orchards clean and well worked. Prune and spray where necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

Where pruning of deciduous trees has not been completed, do so this month. It is not advisable to leave this work too late in the season, as the earlier the pruning is done after the sap is down the better the buds develop—both fruit buds and wood buds; thus securing a good blossoming and a good growth of wood the following spring.

Planting can be continued during the month; if possible, it should be finished this month, for, though trees can be set out during August, if a dry spell comes they will suffer, when the earlier planted trees, which have had a longer time to become established, will do all right—provided, of course, that the land has been properly prepared prior to planting, and that it is kept in good order by systematic cultivation subsequent to planting.

Do not neglect to cut back hard when planting, as the failure to do so will result in a weakly growth.

As soon as the pruning is completed, the orchards should get their winter spraying with the sulphur limewash, and either with or without salt, as may be wished. See that this spraying is thoroughly carried out, and that every part of the tree is reached, as it is the main treatment during the year for San José and other scale insects, as well as being the best time to spray for all kinds of canker, bark-rot, moss, lichens, &c.

Where the orchard has not been ploughed, get this done as soon as the pruning and spraying are through, so as to have the land in good order for the spring cultivations. See that the work is well done, and remember that the best way to provide against dry spells is to keep moisture in the soil once you have got it there, and this can only be done by thorough and deep working of the soil.

When obtaining trees for planting, see that they are on good roots, and that they are free from all pests, as it is easier to prevent the introduction of pests of all sorts than to eradicate them once they have become established. Only select those varieties that are of proved merit in your district; do not plant every kind of tree that you see listed in a nurseryman's catalogue, as many of them are unsuited to our climate. The pruning of grape vines may be carried out in all parts of the tablelands other than the Stanthorpe district, where it is advisable to leave this work as long as possible, owing to the danger of spring frosts.

Where grape vines have been well started and properly pruned from year to year, this work is simple; but where the vines have become covered with long straggling spurs, and are generally very unsightly, the best plan is to cut them hard back, so as to cause them to throw out good strong shoots near the main stem. These shoots can be laid down in the place of the old wood in following seasons, and the whole bearing portion of the vine will be thus renewed.

Where vineyards have been pruned, the prunings should be gathered and burnt, and the land should receive a good ploughing.

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1. The first part of the paper is devoted to a general discussion of the problem of the existence of a solution of the system of equations (1) for arbitrary values of the parameters α and β . It is shown that the system has a solution for arbitrary values of the parameters α and β if and only if the condition $\alpha + \beta = 1$ is satisfied. In this case the solution is unique and is given by the formula

$$x = \frac{1}{\alpha + \beta} \left(\alpha x_0 + \beta x_1 \right)$$

where x_0 and x_1 are the solutions of the system of equations (1) for $\alpha = 1$ and $\beta = 0$ and for $\alpha = 0$ and $\beta = 1$ respectively.

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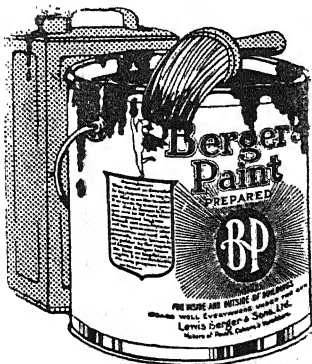
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QUEENSLAND AGRICULTURAL JOURNAL

VOL X.

JULY, 1918.

PART 1.

Agriculture.

RICE—THE COMING POWER.

Last April we received from Mr. J. F. Keane, of Carbeen, Mareeba, N.Q., who is a successful enthusiast on the subject and practice of rice-growing in North Queensland, the following article on "Paddy Rice for the Distillery," for the manufacture of spirit fuel, a subject he dilated on in this journal in October, 1914. He now writes:—

"There is much more—very much more—to be said about it. Rice spirit is to-day the cheapest spirit in the world, aquadenti in Brazil, arack in India, samshoo in China, sake in Corea. All neat O.P. rice spirits seldom run the ultimate consumer, on the very last turnover, much more than a penny a pint. Between the latitudes of Cape York and Cape Capricornia, we have nearly 3,000 miles of longitude and 1,200 miles of latitude uninhabited, more than half of which, on a very conservative estimate, is capable of yielding 70 bushels of rice to the acre. All the implements for sowing and harvesting already exist in very perfected forms. The mechanical operation of producing alcohol from the raw material is very simple and requires little plant. The denaturing of it for industrial purposes presents no difficulties. So that Northern Australia holds an everlasting fount of liquid fuel for all the world.

"The disproportion in bulk between the finished product and the raw material, the value and uses of the residues, and the necessity of having a little of the fuel produced for operating the works, make it advisable that the manufacturing be done in the locality in which the material is grown. Circumstances which appeal to me only for the best in these great 'loan' lands.

"In more than one place in the report the above conditions are stressed as disadvantages.

"In discussing molasses, an objection raised is that 'A great quantity is produced in outlying parts of Queensland, and it hardly seems feasible to regard this raw material in the northern districts of Queensland as a profitable source of liquid fuel for use in parts of Australia far distant from Queensland.'

"With an extract from a weighty English trade journal, I shall close:—

" 'One of the most disturbing factors in the commercial world to-day is the petrol famine. Should further developments of its use continue at the pace they have been doing, petroleum fuel will soon become exhausted for ordinary commercial purposes.'

"A last word to the farmer. Tropical Australia only differs from all other tropical rice countries in that, like the Deccan Plateau, which it resembles in every minutest particular, it is one of the very best of them. Tropical countries are the most delectable and the most prodigally fruitful on the face of the earth. Grow rice and start a co-operative or private still."

Mr. Keane mentions that he had received from the Secretary to the Commonwealth Advisory Council of Science and Industry a copy of an interim report of a special committee on alcohol fuel and engines:—

"On the first showing, molasses looked promising, but, it appears, if all the molasses in Australia were taken for alcohol, it would only make one-sixth of the motor fuel at present being used. Maize is next considered in this wise. 'Allowing that 5,000,000 gallons could be obtained from molasses, it would require 283,000 acres of maize with an average yield of 25 bushels per acre at 2s. a bushel (in New South Wales, it is mentioned, for some reason not at once apparent) to provide raw material for the remaining 15,000,000 gallons required, at the present price of petrol.'

"All the other possible sources of supply dealt with, and their name is legion, are hopeless from a business point of view.

"Which brings me to the quite inexplicable omission, the provoker of this letter. Not once does the word rice appear between the covers of the book."

In a letter dated 18th April, Mr. Keane says that during the late cyclone all the long grass on the savannahs up North was laid as flat as if a steam roller had been over it. On the third day after the cyclone it was all standing up as erect as ever. Precisely the same thing happened to the rice. He saw several paddocks where the rice crop was looking well and just bronzing.

RUST IN WHEAT.

Replying to a correspondent, writing from World's End Creek, for information respecting smut in wheat, the Director of Agriculture (Professor Arthur J. Perkins) said:—"I notice that you complain that in your district smut was very prevalent in the crops last year, even in the case of those that were pickled, and you wish to know whether any reason can be given for this unfortunate condition of affairs. In the first place, it would be necessary to know whether you are referring to 'loose smut,' which appears early in the season, before the grain is ripe, or to what is more generally known as 'bunt,' which is easily recognised by the characteristic of a disagreeable odour which it emits. Generally speaking, pickling is without effect against 'loose smut,' since it is not so much the grain that is affected as the land on which the crop is sown. 'Bunt,' however, can, in my experience, be completely checked by an efficient pickling, and if, in this direction, you and your neighbours have failed, apparently, in the past season, I can only attribute it to defective pickling. It would be interesting to know in this connection how you proceeded. The question of pickling has been referred to so often in the pages of the journal, and by officers of the Department of Agriculture in different parts of the State, that it seems almost unnecessary to refer to it again. I shall, however, indicate briefly the precaution that should be taken when wheat is pickled. In the first place, pickling by immersion of a bag in a tub of bluestone solution is not effective. It is absolutely essential that the grain be thoroughly stirred up whilst in contact with the pickle, and I know of no more efficient method for the purpose than the old-fashioned floor pickling carried out thoroughly. I have very little confidence in the various pickling machines that are now in the market, because, in my view, they do not stir up the grain sufficiently for the purpose. In order to secure good results, you should, in my opinion, proceed as follows:—Place the grain to be pickled on a wooden floor, and pour over it a 1 per cent. solution of bluestone (1 lb. of bluestone to 10 gallons of water) until the solution runs freely away from the grain. The wheat should be turned over vigorously with wooden shovels, and, if necessary, a little more solution may be added from time to time. I must point out that for effective action it is not strength of pickle that counts, but the quantity you use in the mixing-up process. If your grain is somewhat badly affected with smut, do not increase the strength of the pickle, which would only have the effect of injuring the germinating powers of the grain, but use the 1 per cent. solution very freely. I am perfectly satisfied that if you follow out these instructions carefully, and if, in addition, you do not put your wheat back into dirty bags, and if your drill is clean and free from germs of smut, you will have no reason to complain of your crops next year. As a matter of precaution, it is wise to immerse old bags, into which the pickled seed is placed, into the pickle solution before filling them with grain."—"Journal of Agriculture of South Australia."

CASTOR OIL.

The castor oil plant will thrive almost anywhere on the coast-lands of Queensland. In and around Brisbane and other coast cities it may be seen growing and bearing heavy crops of seed in all sorts of out-of-the-way places—on the river banks, in quarries, on unoccupied allotments, &c.—and this applies as well to other coastal localities in Central and North Queensland. No attention, however, has been given to it with a view to turning this valuable plant to profitable account. The plant is exceedingly hardy and will stand a wide range of climate. The seeds, unlike most oil seeds, have extraordinary vitality. Seeds known to have been kept for fifteen years in a bottle have been sown by the writer, near Brisbane, and have produced healthy plants.

In a tropical, or even in a sub-tropical climate, the plant becomes a perennial tree instead of an annual, often attaining a height of from 15 to 20 ft. The plant should thrive well at Thursday Island.

The best soil for castor is much the same as that required for the cotton plant—a rich, well-drained, sandy loam. It will not thrive on heavy, wet, clay soils. As the roots penetrate very deeply, the land must be deeply ploughed and well worked. The seed is planted in rows 6 to 8 ft. apart each way, three or four seeds being planted in a hole. Before planting, they should be softened by having hot water poured over them, and then being left to soak for twenty-four hours. In ten days after sowing the seeds will germinate, and when the plants are 8 or 10 in. high, the three weakest must be taken up where four seeds have been planted together. They grow very rapidly and begin to bear in about four months. Like coffee plants, the castor plant would grow to an inconvenient height if left to itself. It should, therefore, be kept low by pinching back the main stem. This will have the further effect of causing the plant to throw out many more fruit spikes than it otherwise would do. When the tree gets old, the usual scale insect (the *Coccus*) attacks the bark. These have to be dealt with by spraying with kerosene emulsion.

HARVESTING.

When the capsules turn brown, it is time to begin the harvest. This is done by cutting off the spikes and removing them as soon as possible to the barn. The work of harvesting must be done rapidly, for if the seeds are allowed to ripen on the tree, the pods burst open and the seeds fly in all directions. This “popping” of the capsules makes the work of freeing the seeds a very simple one. All that has to be done is to prepare a drying ground either in a shed or in the open. The ground should either be boarded or swept clean. When the spikes are brought in, they should be spread out on the drying ground to the depth of from six inches to a foot, according to the heat of the weather. Should rain occur when out-of-door drying is being carried on, draw the spikes into heaps and cover with a tarpaulin. Turn the spikes over frequently to let all get the benefit of the sun. The capsules will soon begin to burst, and in four or five days they will have shed all their seed. All that now remains to be done is to sift and winnow out the husks. When drying in the open, it is well to surround the drying spikes with a low rampart of galvanised iron or bagging, for the reason that many seeds fly out very violently, and without some such precaution would be lost.

The return from an acre is about 20 bushels, a bushel of seed weighing 46 lb.

EXTRACTING THE OIL.

Those who would venture to embark in the production of castor or other oil seeds have to face the fact that the market is too far distant to leave a margin of profit after deducting the cost of production, freight and other charges. The only remedy, therefore, is to bring the market nearer, and this can only be done by bringing the

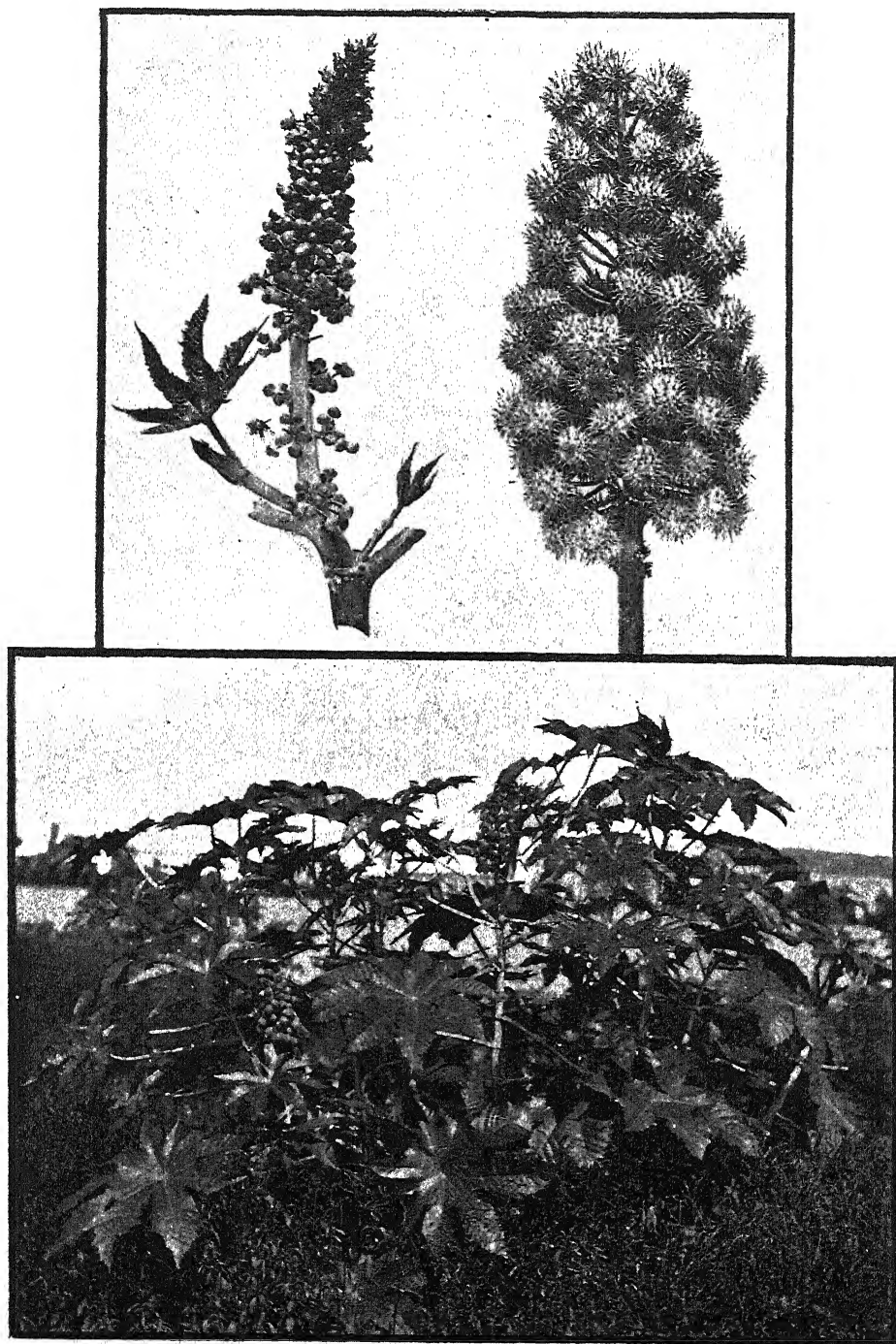


PLATE 1.—CASTOR OIL PLANT. FLOWER AND SEED SPIKES.

oil-miller alongside the raw material. The actual outlay in erecting an up-to-date oil mill is not large, as will be seen by the following (pre-war) estimates:—

Capacity of Mill.					Cost.
					£
30 to 45 cwt. of castor per day	..	..	..	..	750
40 to 70 cwt. of castor per day	..	..	..	..	1,050
100 to 150 cwt. of castor per day	..	..	..	..	2,400
160 to 200 cwt. of castor per day	..	..	..	..	3,000

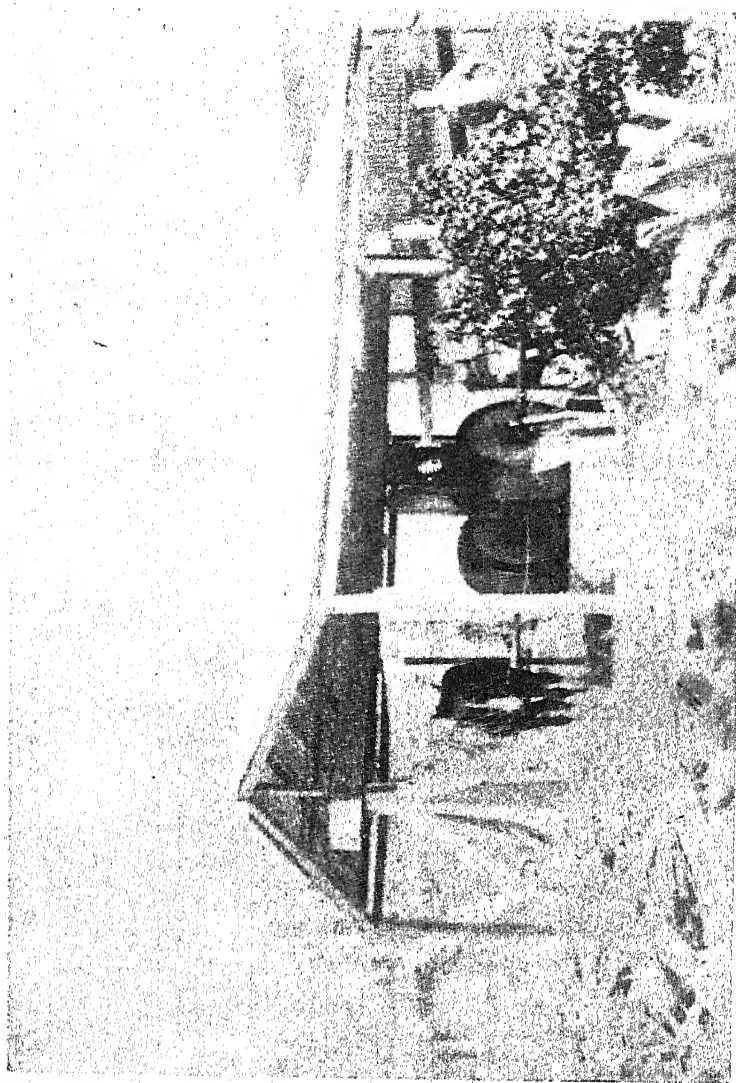


PLATE 2.—CASTOR OIL MILL.

Skilled labour would be required to make the oil. A comparatively simple process can be tried, however, with good results. It is as follows:—

First cleanse the seeds from fragments of the husks and from dust, and submit them to a gentle heat, not greater than can be borne by the hand, which process makes the oil more fluid and more easily expressed. A whitish oily fluid is thus obtained, which is then boiled with a large quantity of water, and all impurities

are skimmed off as they rise to the surface. The water dissolves the mucilage and starch, and the albumen is coagulated by the heat, thus forming a layer between the oil and the water. The clear oil is then removed, and boiled with a small quantity of water until steam ceases to rise, and a small quantity taken out in a phial remains perfectly transparent and cool. The effect of this is to clarify the oil and rid it of volatile acid matter. Care is necessary not to carry the heat too far, as the oil would acquire a brownish colour and an acid taste. Cheap wooden rollers would serve the purpose of crushing, the seed being placed in hempen bags.

A MARKET

would be probably found for oil seeds in Melbourne or Sydney. There are no oil mills in Queensland.

THE WHEAT PLOT.

We avoid having sheep-sick soil by rotating the sheep land with the wheat, breaking up each year a new 100-acre plot for the wheat. Thus the cycle gives the various parts of the farm four years in sheep and one year in wheat. After the wheat we sow turnips, and subsequently rape on part of the 100 acres, sowing down the whole field at the same time in grass. This entails some outlay for seed, and it is difficult to say whether this should be charged to the sheep (which will eat the product) or to the wheat (which has made new sowings necessary). Our best plan here is to dodge the difficulty, and leave this again to the critic to account for. A fence also is necessary for the 40-acre plot. This may be either temporary or permanent. A few 40 and 60-acre paddocks are handy things to have on a sheep farm, and they will not greatly impede the wheat growing.

A TEMPTING SIDE ISSUE.

It would be a very profitable undertaking to sow the whole of the wheat plot subsequently down to turnips and rape, with a view to buying some extra lambs for fattening. Specially prime rape crops have been known to add 4s. per head to fifty lambs per acre. If we make our expectations reasonable, and put the result at twenty lambs per acre, we get an extra £4 per acre from the spare sixty acres of rape, besides, perhaps, a similar earning from the preceding turnips—a total side income of £480. Against this we may reasonably set the cost of seed, regrassing and such manuring as we may choose to apply. It will be well agreed that this system of farming will, in all probability, cause a steady increase of fertility, even apart from the purchased manure, which, however, will speed up that increase, and more than pay its way while doing so.

COST OF A WHEAT CROP.

The laying down of wheat out of grass is fairly well standardised practice. We may outline it like this:—

	Per Acre.		
	£	s.	d.
Preparation (including skim ploughing, discings, the deeper ploughing, harrowing, sowing and rolling) ..	1	2	6
Seed, 2 bushels at 5s.	0	10	0
Manure, 2 cwt. super. at 7s. 6d.	0	15	0
Total	£2	7	6

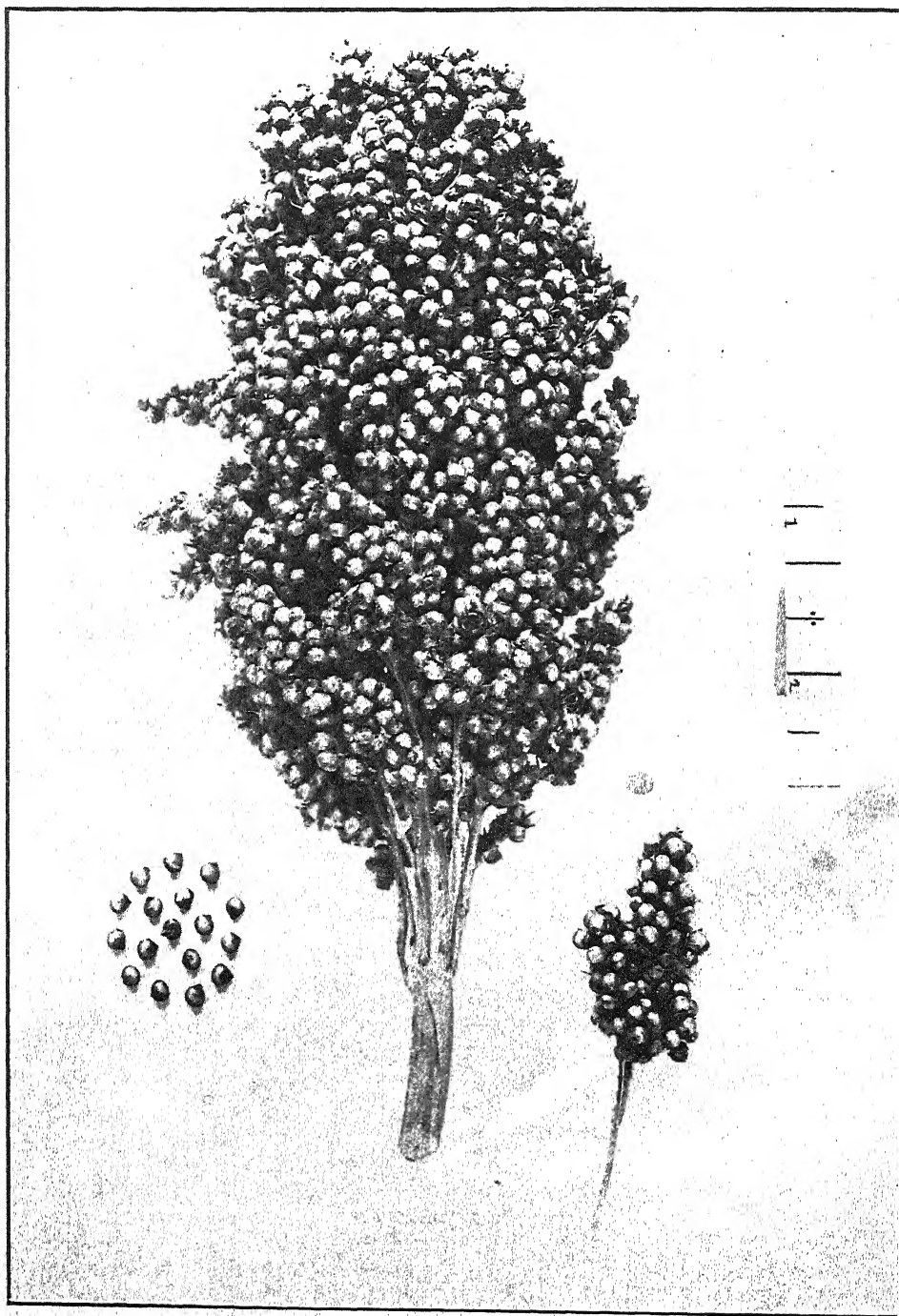


PLATE 3.—STANDARD MILO.

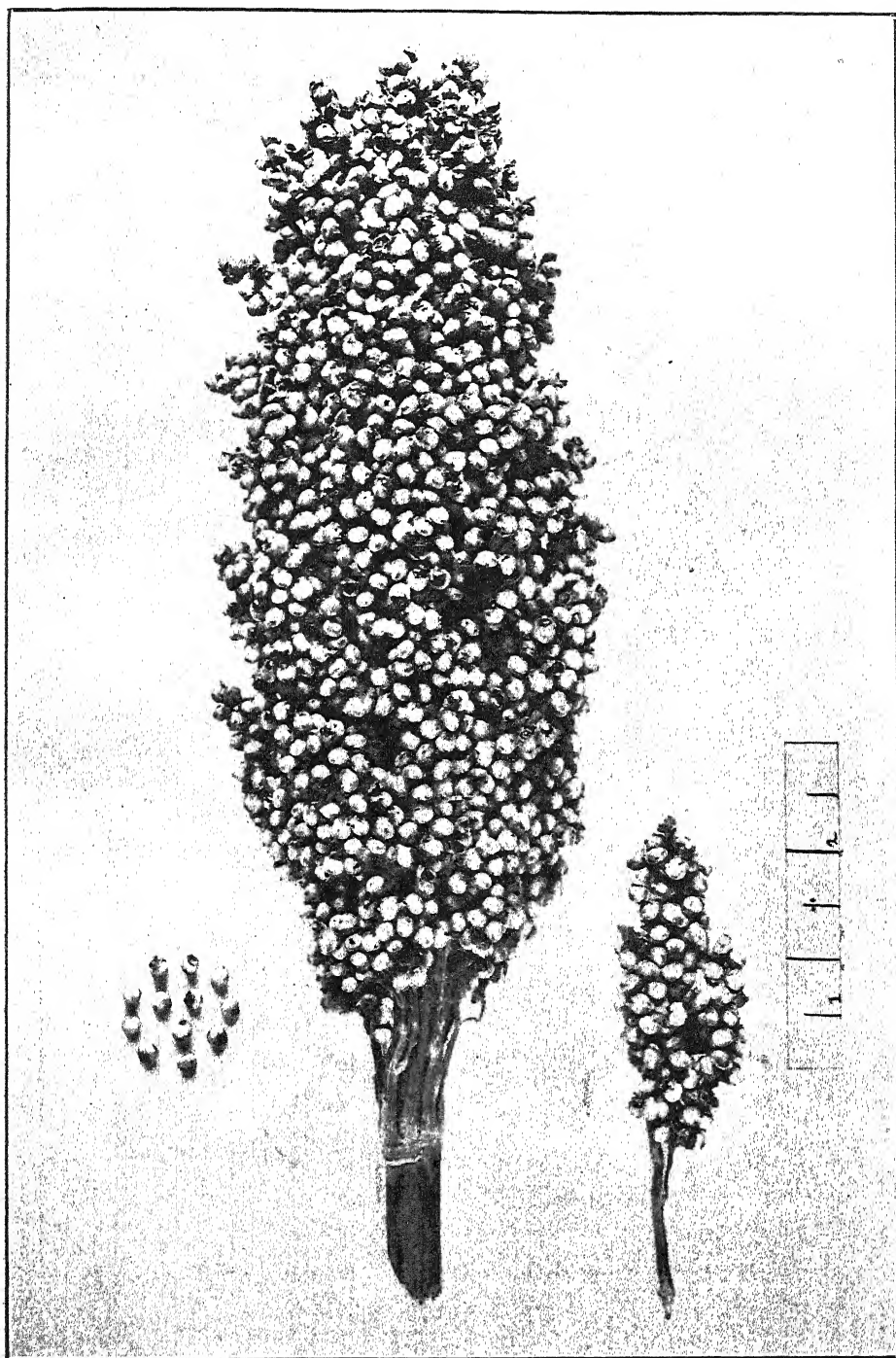


PLATE 4.—FETERITA (SOUDAN DHOUBA).

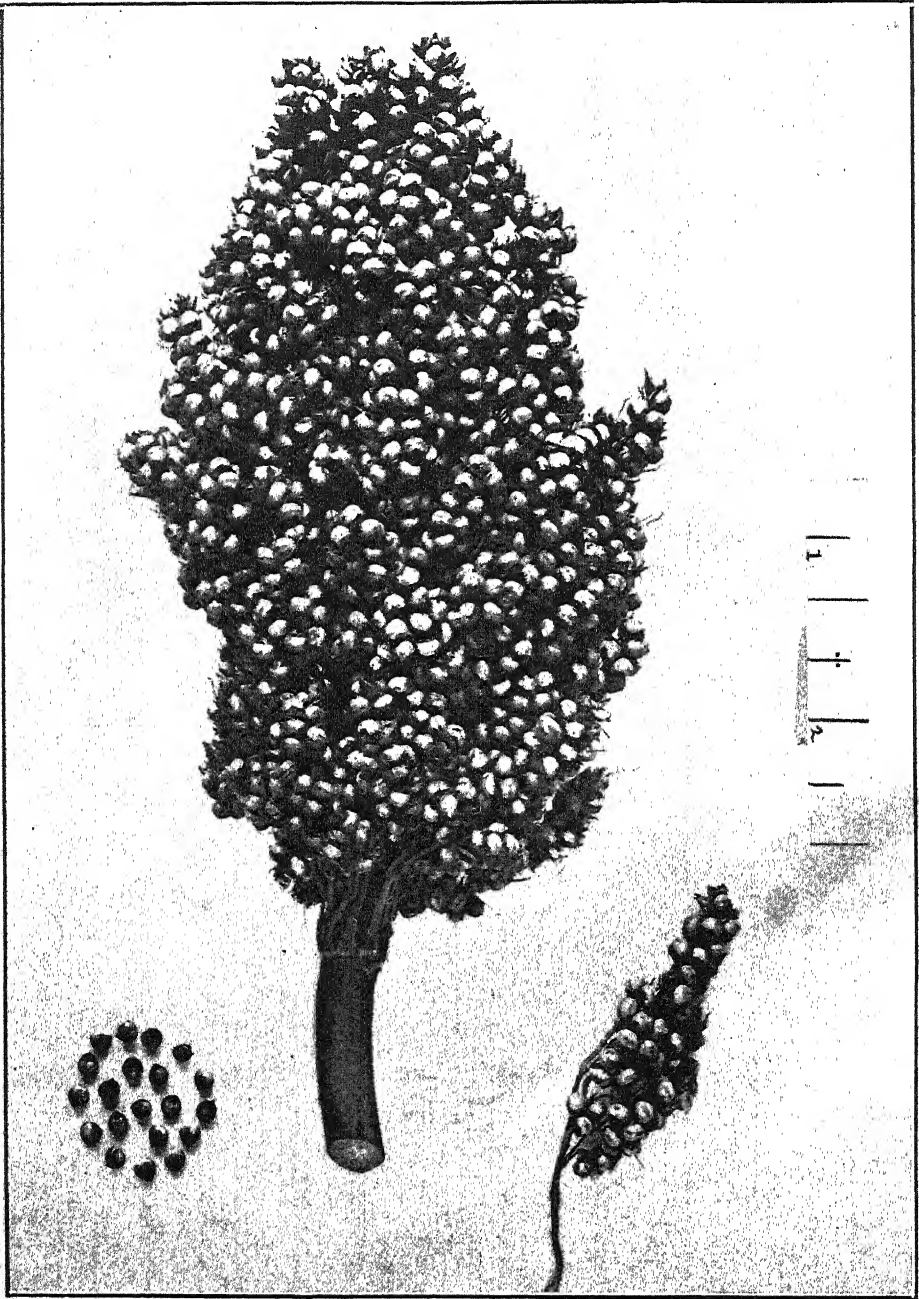


PLATE 5.—CREAM MILO.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Books is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
 The Shorthorn Herd Book of Queensland;
 The Jersey Herd Book of Queensland;
 The Illawarra Herd Book of Queensland;
 The Ayrshire Herd Book of Queensland;
 The Milking Shorthorn Herd Book of Queensland;
 The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS.				
AYRSHIRES.				
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	10	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview," Southbrook	7	34	Do.
JERSEYS.				
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoor	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, via Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.

DAIRY BREEDS—*continued.*

GUERNSEYS.

Queensland Agricultural College	Gatton	2	2	Eligible, but no Guernsey Herd Book of Australia
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HOLSTEINS.

Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman	.. "St. Athan," Wyreema	12	47	Do.
F. G. C. Gratton	.. "Fowlerton," Kingsthorpe	1	15	Do.
R. S. Alexander	.. Glenlondond Farm, Coolumboola	1	3	Do.
Ditto	.. Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings	.. St. Gwithian, Tooloolowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff	.. Inavale Stud Farm, Bunjurgun, Q.	3	9	Do.
E. Swayne	.. West Plane Creek, Mackay	1	2	Do.

ILLAWARRA.

A. Pickels	.. Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	.. Corndale, Coolabunia	3	43	Do.
W. T. Savage	.. Ramsay	2	22	Do.
Hunt Bros.	.. Springdale, Maleny..	3	62	Do.

MILKING SHORTHORNS.

P. Young	.. Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	.. Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	.. Torran's Vale, Lane-field	1	9	Do.
W. Middleton	.. Devon Court, Crow's Nest	3	27	Do.

BEEF BREEDS.

SHORTHORNS.

T. B. Murray-Prior	.. Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall	.. Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan	.. "Arubjal," Condamine	3	6	Do.
W. B. Slade	.. E. Glengallan, Warwick	2	20	Do.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
BEEF BREEDS—<i>continued.</i>				
HEREFORD.				
A. J. McConnell ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Do.
Tindal and Son ..	Gunyan, Inglewood	50	400	Do.
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book of England

SHOWER SHEEP DIP ON CASHMERE WEST.

Mr. W. G. Brown, Instructor in Sheep and Wool, supplies the following directions for the construction of a shower sheep dip, which he saw in action at Cashmere West, on the Balonne River, near St. George, and which, he says, will doubtless interest a good many pastoralists. It differs in some respects from the specifications issued by this Department. It is, so to speak, double-barrelled, and is the first of the kind he has seen. It will be interesting to those who are thinking of dipping, because it is being used by a hard-headed, practical man. Mr. Brown adds: "I do not know whether corrugated iron is better than flat iron for the shower. In any case, I believe the shower dip to be the best medium for the work."

SPECIFICATION.

Capacity.—4,000 sheep per day.

Measurements.—30 x 24 ft., in two separate dips, each 30 x 12 ft., each of which can be worked independent of the other.

Roofing.—This is of galvanised corrugated iron, with a fall each way of 1 in. from the centre, made in two separate trays 30 x 12 ft. Holes in the trays 3 in. x 3 in. apart are made with a punch the size of No. 10 wire.

Flooring.—Cement 4 in. thick, set on a foundation of stones 10 in. thick. The floor has a slight fall to the centre for drainage.

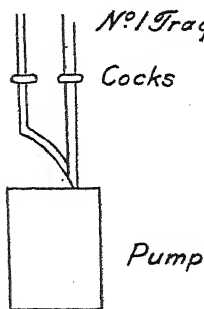
Supports.—8 x 4 in. posts, each post 7 ft. out of the ground, and 7 ft. 6 in. apart.

Rafters.—On supports only 7 ft. 6 in. apart.

Walls.—Closed in with galvanised iron, except in the centre, where the top sheets are kept down for observation.

Pump.—Three-inch Tangye centrifugal, driven by a 4 h.p. Walesby petrol engine.

Supply Pipes.—Three-inch pipes leading from pump to each separate tray as *Nº2 Tray* and pipes over trays bored with $\frac{1}{2}$ -in. holes $1\frac{1}{2}$ to 3 in. apart.



Reservoir.—Round in shape; walls 4-in. concrete, 9 ft. across, 4 ft. deep at sides and 4 ft. 10 in. in centre. Two 2-in. pipes 6 in. from top of reservoir, with bagging strainer to let in clean water from bore drain.

Straining.—Many methods were used which proved useless on account of the heavy flow of liquid. The trouble was mastered in the end by using an ordinary cheese-cloth bush mosquito net, which had to be cleaned out every couple of runs.

Although the flow of water was supplied by 3-in. pipes, it took a full flow in a 6-in. pipe to take it away off the floor to the tank, and even then there would be 3 in. of liquid in the centre of the pen, which was a danger to sheep getting down and drowned if the pens were too full.

Working.—Gates on both ends of each pen, while the supply pen, before entering the dip, was floored with battens to prevent dirt being carried in.

After draining, the sheep are let out into the drying yard. It was found necessary to discontinue dipping at about 2 p.m. on account of the cold nights, which were very severe on sheep dipped late in the afternoon.

DIPPING AS A PREVENTIVE AGAINST INTERNAL PARASITES OF SHEEP.

The subjoined extract from "The Veterinary Record," London, contained in the Annual Report of the Government Veterinary Bacteriologist, Southern Rhodesia, S.A., for the year 1916, has a strong bearing on the conclusions drawn by the Department of Agriculture and Stock in this State *in re* the dipping of sheep. These experiments in Rhodesia are almost identical in method with those of some of our Departmental experiments on Gindie State Farm and Dalmally, Roma District. Mr. W. G. Brown, Instructor in Sheep and Wool, says:—"I have long been of the opinion that dipping in a poisonous dip has a beneficial effect in cases where stomach worms are prevalent, and am glad to get corroboration from so excellent a source as the above well-known journal. The following is the extract above alluded to:—

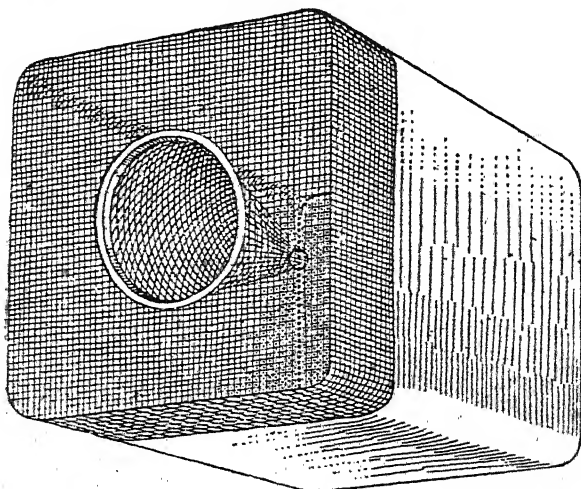
DIPPING OF SHEEP.

"Reference may be made to an experiment carried out at the request of the Chief Veterinary Surgeon to ascertain the effects of 'short interval clipping' upon sheep and lambs. A small flock made up of 39 sheep and lambs of mixed breeds,

the majority being half-bred Persians, but six of long-woolled varieties, was purchased for the purpose. All these animals were in a most emaciated condition, and suffering from fluke, wire-worm, tape-worm, and nodular worm of the intestines. It was with difficulty that they were driven from the farm from which they were purchased to the laboratory. On the 5th February dipping was commenced in Cooper's dip, 1 in 300 strength, in which they were immersed three times in ten days, the strength of the dip then being increased to 1 in 250. Dipping was carried on regularly twice a week in this strength until the 16th April, making 19 dippings in all. During this period, ten animals died—namely, four sheep (one woolled), and six lambs, these being the weakest of the flock. The rest of the flock improved markedly in health. The experiment was then discontinued, but the result is still apparent in that the survivors are still alive and in the best of condition, and the ewes have given birth to lambs, which have thriven and grown out in spite of the fact that most of them have been born during the dry season. The experiment was originally intended to determine to what extent small stock could be dipped with safety in areas which have to be freed from African Coast fever. It is possible that such drastic measures could not be applied in a damp atmosphere, or to woolled varieties—because of damage to the fleece; but, in practice, this would not be necessary. The experiment has, however, gone further; it affords support to the observation of officers in the field that dipping exerts a beneficial action upon sheep infected with worms. The results have been so remarkable that when opportunity arises, further experiments of a more exact nature will be carried out."

A SIMPLE TYPE OF BLOWFLY TRAP.

The question of destroying sheep-maggot flies by trapping them before they have time to deposit their eggs upon the sheep has been advocated by the New South Wales Department of Agriculture for some time, and a number of sheepowners have been trapping flies in various ways, with very marked results.



A number of different traps have been advertised, and placed on the market by dealers, some at a price almost prohibitive where large numbers are required. Mr. J. L. Froggatt, B.Sc., officer in charge of the N.S.W. Government Sheep-fly Experi-

ment Station, has been experimenting for some time with a view to producing a simple trap, at a very low cost, that can be set and looked after by any station hand.

The illustration shows one that can be made on any homestead by a handy man with an empty petrol or kerosene tin, and some wire gauze.

HOW TO MAKE THE TRAP.

The end is removed from a kerosene tin and the open space covered with galvanised wire gauze which overlaps the sides of the tin about two inches, and around which it is bent. Let into the wire gauze covering is a funnel four inches across at the top and five inches in length, the opening at the apex (*i.e.*, into the tin) being about the size of a threepenny piece. The inside of the tin is painted white with cold-water paint; if the outside is also painted the life of the trap will be prolonged considerably.

This type of trap has been tested at the Government Sheep-fly Experiment Station, and has also been used by many pastoralists with excellent results.

For a bait any offal (although the heart, liver, and lungs are the best), putrid meat, dead rabbits where obtainable, or milk which has been left to go sour and then putrefy, can be used with very satisfactory results.

This trap is to be used upright, not on its side, as in the illustration, which is only to show the type of funnel, &c.—“Pastoral Review.”

SPRAYING CATTLE IN TRANSIT.

Several years ago we (“Pastoral Review”) advocated a system of spraying cattle in hot weather *en route* in the railway trucks, as in Argentina and other countries which are in advance of Australia in the matter of stock-conveying methods. In hot weather in those countries the trains are run under showers, the roofs of the trucks slide open, the cattle get a shower, and the train passes on with little delay, and no shunting. However, we cannot expect anything so sensible here, so must get the next best method available. A Mr. G. S. Davis, of Sydney, has been for several years conducting experiments with this object. His scheme is to fix an iron tank on each cattle wagon. The tank is filled with water at the starting point, and is expected to last a whole journey, even up to 500 miles. The spray is regulated, and can be turned on by the driver in charge at any time.

The spraying keeps the cattle fresh and cool. It means a cool truck in the hottest day of summer. The cattle consequently suffer less, waste less, and don't fall down. It is profitable as well as humane. The cattle are better, and look better.

On a long journey in summer fat cattle waste a good deal. This spraying saves a lot of that, and in this way alone it should mean a considerable gain to the owner and the country. Then, again, it is claimed that the cattle are much less likely to go down. In eight big trips with the sprayed truck not a single beast was lost. On the same trips, in the unsprayed trucks cattle did go down. The cattle in the sprayed truck don't get so leg weary, and they remain fresh.

Dairying.

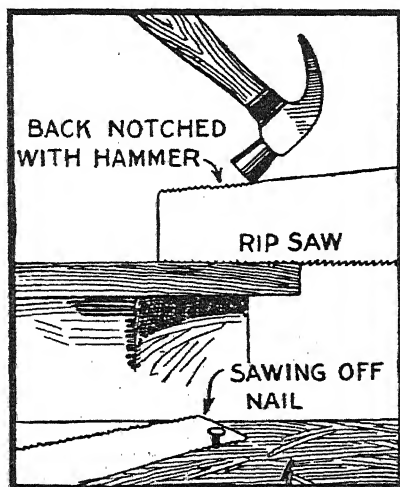
THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FROM 30TH APRIL TO 29TH MAY, 1918.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Melba ...	Holstein ...	31 Mar., 1918	1,177	3.3	42.91	
Lady Margaret ...	Ayrshire ...	28 Dec., 1917	558	4.6	28.87	
Constancy ...	" ...	7 April, 1918	677	3.6	27.08	
Charming Damsel ...	" ...	1 May "	558	4.3	26.90	
Lady Peggy ...	" ...	30 Mar. "	573	4.0	25.60	
Leading Lady ...	Jersey ...	26 Dec., 1917	378	6.0	24.88	
Charity ...	" ...	24 April, 1918	439	4.9	24.25	
Lady Spec... ..	Ayrshire ...	19 Feb. "	640	3.4	24.08	
Dawn of Warragaburra	Jersey ...	4 May "	463	4.6	23.95	
Jeannie ...	Ayrshire ...	13 Dec., 1917	504	4.2	23.70	
Hedge's Nattie ...	Holstein ...	1 Feb., 1918	584	3.5	22.66	
Leda's Jessie ...	Jersey ...	25 Mar. "	433	4.5	21.89	
Royal Mistress ...	Ayrshire ...	13 Mar. "	518	3.7	21.31	
Yarraview Ida's Hope	Guernsey ...	5 May "	405	4.6	20.95	
Belinda ...	Ayrshire ...	14 Jan. "	469	3.9	20.39	

SAWING NAILS.

When working up old timber it often happens that nails buried in the wood are encountered, to the detriment of the saw. This difficulty can be overcome as shown in the accompanying sketch published in the "S. A. Farmers' Advocate":—



The nails may be sawn through without injury to the saw, by notching the back edge of the saw with a hammer as here shown, and using this edge to saw through the nails. If the notches are made small, this will merely add to the saw's usefulness.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, MAY, 1918.

The total number of eggs laid during the month was 5,979. The Dixie egg plant again wins the monthly prize in light breeds with 154 eggs, while Nobby Poultry Farm wins amongst the heavies with 154 eggs also. It has been a good month for egg production. Although westerly winds were prevalent during the second week, it is pleasing to note that they did not in any degree affect either the birds or their productiveness. The following competitors have had cases of broodiness:—W. Smith (2), A. E. Walters (2), H. Puff (2), W. H. Reilly (3), W. J. Mee (1). There are still a few stray cases of moult. The health of the birds has been excellent. The following are the individual records:—

Competitors.	Breed.	May.	Total.
LIGHT BREEDS.			
*Dixie Egg Plant	White Leghorns ...	154	293
*Mrs. L. Henderson	Do.	122	236
*E. Chester	Do.	136	231
*G. Prince	Do.	140	230
*G. W. Hindes	Do.	141	226
*C. P. Buchanan	Do.	138	224
*C. Knoblauch	Do.	130	223
*T. Fanning	Do.	119	223
H. Fraser	Do.	116	219
*O.K. Poultry Yards	Do.	124	216
*G. Howard	Do.	136	212
B. Caswell	Do.	108	209
*W. Becker	Do.	116	207
*Dr. E. C. Jennings	Do.	109	204
*Range Poultry Farm	Do.	102	201
*Oakland Poultry Farm	Do.	126	193
*G. H. Turner	Do.	118	192
*W. Lyell	Do.	127	191
*L. G. Innes	Do.	91	186
J. J. Davies	Do.	114	181
G. W. Williams	Do.	99	181
O. W. J. Whitman	Do.	109	180
*T. Taylor	Do.	107	177
*Quinn's Post Poultry Farm	Do.	100	162
*R. Holmes	Do.	124	160
Progressive Poultry Pens	Do.	56	160
*C. Porter	Do.	88	159
*J. Zahl	Do.	106	158
*E. A. Smith	Do.	96	156
Mrs. A. G. Kurth	Do.	94	144
G. Trapp	Do.	90	142
S. Wilkinson	Do.	62	142
*T. B. Hawkins	Do.	78	139
*Mrs. A. T. Coomber	Do.	76	139
H. F. Britten	Do.	75	139
R. T. G. Carey	Do.	96	137
*J. W. Newton	Do.	72	134
Mrs. L. F. Anderson	Do.	64	133

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Map.	Total.
LIGHT BREEDS— <i>continued.</i>			
*J. M. Manson ...	White Leghorns ...	83	123
*Himalayan Poultry Farm ...	Do. ...	63	112
H. B. Stephens ...	Do. ...	65	109
Shaw and Stevenson ...	Black Leghorns ...	92	100
*Mrs. R. Hunter ...	White Leghorns ...	69	89
P. O. Oldham ...	Do. ...	49	83
A. W. Walker ...	Do. ...	55	68
W. A. Wilson ...	Do. ...	48	51
B. Chester ...	Do. ...	8	45
HEAVY BREEDS.			
*Nobby Poultry Farm ...	Black Orpingtons ...	154	243
T. Hindley ...	Do. ...	132	199
*W. H. Reilly ...	Chinese Langshans ...	103	198
*W. Smith ...	Black Orpingtons ...	75	180
*A. E. Walters ...	Do. ...	87	179
*E. F. Dennis ...	Do. ...	101	152
W. J. Mee ...	Do. ...	99	150
*E. Morris ...	Do. ...	87	135
E. M. Larsen ...	Do. ...	107	131
*J. W. Macrae ...	Do. ...	32	122
*Mars Poultry Farm ...	Do. ...	90	102
H. Puff ...	Rhode Island Reds ...	31	80
*R. Burns ...	Black Orpingtons ...	67	77
*D. Fulton ...	Do. ...	28	63
Th. W. Lutze ...	Do. ...	43	43
A. Shanks ...	Do. ...	42	42
*F. A. Claussen ...	Rhode Island Reds ...	38	38
J. Fitzpatrick ...	Do. ...	22	26
Totals ...	...	5,979	9,979

* Indicates that the pen is engaged in single hen test.

RESULTS OF SINGLE HEN PENS.

Competitor.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
Dixie Egg Plant ...	45	48	53	44	50	53	293
Mrs. L. Henderson ...	44	42	38	20	45	47	236
E. Chester ...	28	44	35	46	47	31	231
Geo. Prince ...	20	41	43	45	41	40	230
G. W. Hindes ...	53	43	37	40	30	23	226
C. P. Buchanan ...	39	28	40	31	46	40	224
T. Fanning ...	39	41	42	19	43	39	223
C. Knoblauch ...	33	28	44	33	43	42	223
O.K. Poultry Yards ...	41	39	40	27	38	31	216
Geo. Howard ...	32	32	41	31	35	41	212
W. Becker ...	34	34	26	41	31	41	207
Dr. Jennings ...	27	41	41	40	38	17	204
Range Poultry Farm ...	22	44	25	39	31	40	201
Oakland Poultry Farm ...	30	33	41	37	24	28	193
G. H. Turner ...	5	27	40	37	47	36	192
W. Lyell ...	40	39	38	31	23	20	191
L. G. Innes ...	19	45	46	27	10	39	186

RESULTS OF SINGLE HEN PENS—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS— <i>continued.</i>							
Thos. Taylor	22	38	38	18	27	34	177
Quinn's Post Poultry Farm ...	40	27	18	25	39	13	162
R. Holmes	42	30	18	21	21	28	160
C. Porter	0	31	30	26	35	37	159
J. Zahl	35	29	25	30	25	14	158
E. A. Smith	4	44	30	42	34	2	156
T. B. Hawkins	30	18	36	8	34	13	139
Mrs. A. T. Coomber	10	33	23	24	10	39	139
J. W. Newton	28	37	1	17	30	21	134
J. M. Manson	41	29	40	1	11	1	123
Homalayan Poultry Farm ...	37	32	8	0	35	0	112
Mrs. R. Hunter	9	30	2	11	15	22	89

HEAVY BREEDS.

Nobby Poultry Farm	48	42	37	30	38	48	243
W. H. Reilly	30	42	37	25	26	38	198
W. Smith	43	35	18	19	31	34	180
A. E. Walters	30	41	25	33	43	7	179
E. F. Dennis	43	18	20	0	45	26	152
E. Morris	6	38	40	37	14	0	135
J. W. Macrae	0	0	39	12	34	37	122
Mars Poultry Farm	9	23	22	16	11	11	102
R. Burns	10	7	0	1	37	22	77
D. Fulton	3	3	4	2	1	50	63
F. A. Claussen	10	7	0	4	17	0	38

DUCKS AND THEIR MANAGEMENT.

By J. BEARD, Poultry Instructor.

There are many varieties of domestic ducks, amongst which, the best known are the Aylesbury, Pekin, Rouen, Blue and Buff Orpington, Indian Runner, and Muscovy. Generally speaking, ducks are hardier and more easily reared than fowls. They are comparatively free from disease, and seldom troubled with insects. They stand confinement well, especially the heavier breeds, and for this reason alone duck-rearing might be taken up on a much larger scale in Queensland than is the case at present.

In most countries the breeding of ducks ranks on an equality with any other branch of poultry-keeping. In America there are some very large duck farms which produce many thousands of ducks that are sent away in carloads to the central markets.

The Indian Runner is the smallest of the duck family, and is not a desirable duck for market, but, on the other hand, it is one of the most profitable egg-producing ducks that we have in Queensland and can be depended upon for its excellent laying qualities. There are three varieties of the Indian Runner duck—fawn and white, white, and black, the first named being the most popular at present. The white variety, so far, does not find many admirers and is seldom seen on the show benches. The blacks, so far as I know, have not made their appearance in Queensland.

Indian Runners are hardy, easily reared, and are grand foragers. They do well with little swimming water. For the size of the bird, the egg is remarkably large, of good shape, and mild in flavour.

The standard weight for drakes is $4\frac{1}{2}$ lb. and for ducks, 4 lb. The weight in either sex should not exceed $5\frac{1}{2}$ lb., nor be less than $3\frac{1}{2}$ lb.

The Aylesbury is the premier table breed in England, and is of European origin, generally believed to have originated in England. The plumage of the Aylesbury is white, and does not show so much of a yellowish tinge as that of the Pekin. The Aylesbury matures very quickly, faster than any other breed; and ducklings, if properly fed, should weigh 5 lb. to 6 lb. at ten weeks. In the Aylesbury district in England, where this breed is largely kept to supply the London market, one does not find the somewhat exaggerated type familiar in the show pen. The bird, as bred there, is more upright in carriage than the exhibition type, with little or no keel. They weigh considerably less, too, and are consequently more active. Some strains of the Aylesbury lay well, but, generally speaking, they are not so prolific as the Indian Runners or Pekins. Their eggs are of fair size, and vary in colour from white to green. The Aylesbury and Pekin make a very good cross for table purposes.

The standard weights are:—Drake 10 lb., duck 9 lb., although exhibition specimens often scale more. The colour should be pure white with dark eyes, pink-white bill, legs and feet bright orange. The carriage should be horizontal with the keel (*i.e.*, the vertical part of the breast bone and the dependent flesh and skin below it), practically parallel with the ground.

The Pekin duck, which owes its origin to China, has been greatly improved in size and quality since its introduction to other countries. Although they mature somewhat more slowly than the Aylesbury for the table, they are more active, better layers, and less liable to leg weakness, owing to the fact that their carriage is more natural. There are not many breeders who go in for the pure-bred in Queensland. In fact, there is not much demand for the pure-bred in Australia, except for show purposes. Most specimens contain a touch of the Aylesbury, and the cross seems to have taken on better with breeders. The standard weights are:—Drake 9 lb., duck 8 lb. The colour is a deep cream; eyes, dark lead-blue; feet and legs, bright orange; bill, orange and free from black marks. In carriage they are almost upright, though not so erect as the Indian Runner. There should be no keel, except just between the legs, where it shows very slightly. The breast should be broad and full, the paunch and stern, deep and broad, and carried just clear of the ground. The Pekin is a non-sitter, though some strains will give slight evidence of the maternal instinct.

The Rouen is undoubtedly the most beautiful of all our domesticated breeds of ducks and is said to originate from Rouen, in France. They resemble in colour the mallard or wild duck, from which they are directly descended. In type and size they are very similar to the Aylesbury, the horizontal carriage and deep keel being much the same in both breeds. They mature very slowly, and are only fair layers, the eggs being somewhat small. They are good roasters, the flesh of the pure kind being dark. Owing to their handsome appearance, they have of late been bred largely for exhibition purposes. In the scale of points given for drakes of a possible 100, no less than 60 are given for colour and markings. The standard weights are:—Drake 10 lb., duck, 9 lb.

The Muscovy duck, originally found in South America, materially differs from other ducks, and is generally considered to be a distinct species of duck, and not a descendant of the wild mallard. This duck is making great headway in Queensland, and owing to the great demand of the breed for table purposes it commands a ready sale at all times, being a quick grower, it is ready for the table at fourteen weeks. The Muscovy is a perfect sitter, covering from 15 to 20 eggs, according to size. If she is provided with comfortable warm quarters she will mother 50 ducklings at a time. The Muscovy is of a very hardy nature, and prefers to select its own nest in a secluded place, and hatch her own eggs. I would advise inexperienced hands not to try and hatch the eggs in incubators as failure would be sure to follow. Splendid table birds can be obtained by crossing the Muscovy with either the Aylesbury, Pekin, or Rouen. This cross, being mules, is non-productive.

HOUSING.

The housing of ducks is a simple matter. A low lean-to shed, 4 ft. high in front and 3 ft. high at the back, will answer the purpose well. The back and ends should be boarded, and the front to face north or north-east, and covered with wire netting, so that the morning sun can get inside. Ducks must have plenty of fresh air. The floor must be well raised above the surrounding ground and should be hard and dry. This is very important, as young ducks are subject to rheumatism. A wooden floor should on no account be used, as it not only becomes quickly tainted, but remains damp for a long time when once wet, and always makes a safe harbourage for insects and vermin generally. Plenty of clean bedding should be supplied—twice weekly at least. Bush hay or mill chips should be used, if available.

In the breeding season, the ducks should be kept in the house, or, at any rate, away from their swimming water until 10 a.m., as many will lay in the water, and the eggs become spoilt or lost. A good plan is to wire off part of the run next to the house, and supply the birds with drinking water only, until they have laid.

A breeding pen generally contains one drake and four or five ducks. If one has unlimited space and water, and the aim of the duck farmer is only to raise ducklings for the market, ten or twelve ducks and three drakes may be run together. The male birds soon settle down, and seldom interfere with each other.

I would not advise mating young stock birds under twelve months old. A vigorous drake about twelve months old, mated to two-year-old ducks, as a rule, gives good results. One must have maturity on one side or the other. It is very important that males and females should not be related in any way, if hardy, vigorous youngsters are required.

The first two batches of eggs laid in the season are generally unfertile, and care should be taken by those selling sittings to test all eggs for a week or more by putting a few into the incubator or under a broody hen before sending them out to customers. Duck eggs, as a rule, travel badly, and great care must be taken in packing them securely.

SHADE AND SHELTER

from the hot sun and cold winds are very necessary, as young ducks are unable to stand the hot sun on their heads for long, their skulls being very thin. Shelter from the cold winds should also be provided. The best kind of shelter is natural shelter, therefore all trees or bush should be left in the pens when possible. Some people make a great mistake by clearing all natural trees from the yards and then have to build artificial shelter afterwards.

The most convenient fence for a duck-yard is 2 ft. netting. While this will keep the ducks within bounds, it is convenient for the attendant to step over from one yard to another without having to go round to the entrance. Muscovys, of course, would require something higher, but 4 ft. would answer the purpose.

FEEDING.

Mash should be fed to ducks in troughs. It should never be thrown on the ground. In this way, there is no waste, and the runs do not become tainted with sour food. Mash for ducks should be mixed more moist than that for other kinds of poultry. For breeding ducks the following is recommended:—Two parts bran, 1 part pollard, 25 per cent. of cooked vegetables or green lucerne chaff scalded, to which should be added 10 per cent. of meat or dried blood.

It is very important that ducks should be supplied with meat. When at liberty, they pick up a lot of insect and animal life on the banks of creeks and swamps, such as slugs, frogs, &c., so if good results are required, this must be attended to. The meat can be cooked overnight, and, together with the soup, mixed in with the mash. All grain should be fed to ducks under a few inches of water. It is the most natural, and, consequently, the easiest way for them to pick it up. A half kerosene tin answers very well for the purpose. Grit should be given to them in the same manner. It is most important that ducks should be well supplied with the latter.

Ducks in the breeding pen must not be allowed to get too fat, otherwise the fertility of the eggs will suffer. Ducks are large eaters and put on condition quickly. Do not leave food before them all day long. Remove the trough after they appear satisfied. Green feed, such as chopped lettuce or green lucerne, can be given to them daily at noon; the latter should be scalded and dried off with a little bran.

Changes of food should be made gradually, especially when the ducks are in full lay. Lessening the quantity of meat will quickly cause a great falling off in the egg yield. Of the various grains, small hard wheat is one of the best. Short, plump oats are also excellent. Maize must be fed with discretion to the breeding stock, especially during hot weather. This grain is too fattening, and a laying duck should be in hard condition.

Fertility is always much better when a fair amount of water is available—not necessarily deep water. More especially is water necessary for breeding pens of the heavy varieties. Young ducks being raised for the market do not require swimming water, although a swim once or twice weekly will not do them any harm.

INCUBATION.

During the period of incubation, which is twenty-eight days, duck eggs require more moisture than do the eggs of hens or turkeys. From the sixth day, after the eggs have cooled and aired, and just before closing the drawer of the incubator, they

should be well sprinkled with tepid water. For duck eggs, the incubator should be run at a slightly lower temperature than for fowls, 102 to 102½ degrees giving the best results. Owing to the transparency of the shell, a duck egg can be tested on the fifth or sixth day. A second test should be made on the thirteenth or fourteenth day, and all doubtful eggs removed from the drawer. An added duck egg gives off a powerful odour, which is most harmful to the remaining eggs in the incubator. The bad eggs are easily detected, as the transparent shell quickly becomes discoloured.

From the time the egg chips, the duckling takes a long time to get out of the shell. After the egg is chipped, all that requires to be done is to place the egg with the chipped part uppermost. It should then be left for about 30 hours. If not then hatched, a little of the shell may be broken round the large end. If any bleeding occurs, however small, one may be certain that the duckling is not ready to make its way out of the shell and should remain a little longer.

Duck eggs intended for incubation should not be kept longer than ten days. It should be remembered that the fresher the egg the stronger the germ. This applies to all eggs.

REARING AND FEEDING DUCKLINGS.

Young ducks require very little brooding after the first week. A warm box lined with hay or straw will answer the purpose. Care must be taken to allow plenty of ventilation. No food is required for the first 30 hours after hatching. From that time onward food should be supplied little and often. With the first feed, water should be given, and then it should always be before them. A small flat fish tin is the best. Young ducks are easily chilled, especially if their backs get wet.

A small board well sanded should be put down for them, and their soft food, which should be fairly moist, put on it, just sufficient at a time for them to readily clean up. Food should on no account be left lying about. It quickly turns sour, and does a great deal of harm to the young ducks. Boiled rice, oatmeal, pollard, stale bread soaked with milk, and a small quantity of maize meal mixed makes a grand feed for them. After the first fourteen days a little cooked meat may be added. Chaffed lucerne, lettuce, or raw onion can be added with advantage to the above mixture.

After three weeks, if the ducklings are well grown, a little grain can be given, put in a shallow dish, and covered with water. Fine grit should always be before them in the same way, and fine charcoal, given dry, should always be at hand for them.

Young ducks are very easily knocked over by the hot sun, and, consequently, they must be well shaded, especially during the first month. This is a very important point in rearing ducks. Care must also be taken that they are not allowed out in heavy rains.

If the ducklings are being reared for stock birds, they should be allowed plenty of liberty, and naturally not so much food should be given as to those required for the table.

THE MUSCOVY DUCK.

THE GOLD MINE OF THE POULTRY BUSINESS.

By R. G. T. CAREY, Beerwah.

Originally the Muscovy duck—a wild South American duck—was caught and domesticated, and by careful breeding these ducks have been mated up to a very fine standard of perfection.

Their natural colour was black and white, or blue-black and dirty white, but fanciers have created two distinct colours—white or black. The snowy white variety is, however, much more admired for its beautiful white plumage, scarlet face, and pale orange coloured legs, and these are much more acceptable for market purposes on that account. Their flesh is of fine flavour, and in greater proportion on their breast bones than in any others of the duck family, and when in their prime they often turn the scales at 12-14 lb.

The Muscovies are noiseless, very docile, good layers, and as sitters, hatchers, and mothers are excellent. Incubators cannot equal their results as hatchers. They choose and make their own nest, lay, sit and hatch, and owners have absolutely no worry. Being small eaters, upon a free range they can practically feed themselves. That is another point greatly in their favour. Their food consists of over half greenstuff—grass, weeds, roots, and other herbage. Therefore, two meals per day and free range make them mature quickly. They commence to lay at between 5 and 6 months old, and generally desire to sit after laying from 20 to 30 eggs. Furthermore, Muscovy ducks, from birth onward, are extremely hardy and seldom ail.

The ducklings are of strong constitution from the shell. They agree very well among themselves, therefore a whole flock can be allowed to range together. Wherever Muscovy ducks are kept, they never cause any annoyance to neighbours, are never alarmed or timid, and it is practically impossible to frighten them. As travellers they make the best, sitting in their coops as contentedly as if in their own pen.

The rapidity with which this variety has leaped into favour is marvellous, and being marketable at an early age they command a high value. Hotels, restaurant and boarding-house proprietors favour them because of the high qualities of meat they possess.

They keep far easier than fowls in condition, and are always plump. There is no special season for hatching them, and the ducklings are exceptionally strong at all times, continuing so right merrily along, growing and fattening rapidly on any good food.

Duck farmers starting in a small way have three methods of making a beginning. First, hatching with incubators; second, using Muscovy ducks as hatchers and mothers; third, buying day- or week-old ducklings from some reliable breeder, whose plant is prepared for this purpose. We highly recommend the latter plan as being the most reliable for beginners.

Should Muscovy ducks be used, you will require to purchase a pen of birds, and use their eggs, or buy a setting from some reliable breeder. They are generally dispatched promptly in the season, and should arrive in good condition.

Should you decide to obtain ducklings, you will require a brooder for rearing them up to three weeks old. All young birds must have the correct food to maintain and replace waste tissue, also to enable them to create flesh, bone, feathers, and increase in size.

Always feed at regular times, laying stocks as well as breeders, giving a small mid-day meal in cold weather. Should your birds increase in fat, do not decrease the quantity of food given, but add a greater bulk of greenstuff.

Remove all foods from troughs after twenty minutes to half an hour, so that no sour food remains. If birds are confined in a limited space they are likely to go off their food, consequently the egg yield suffers.

As this class of water fowl is easily kept, reared, and quickly sold, a huge profit is assured for an enthusiast in duck farming. The writer has prepared a beautiful catalogue for everyone who desires to enter into Muscovy raising. The book may be obtained free of charge.

QUEENSLAND CITRUS IN MELBOURNE.

A leading Melbourne fruit merchant directs attention to the packing methods adopted by Queensland citrus growers, and emphasises the advantages of the "rowed in" pack against the Florodora pack. The chief advantage of the former is from the standpoint of selling. Buyers desire to know the number of fruits in the cases, because they rapidly calculate at how much per dozen the fruits will sell retail; and thus, by knowing how many dozen fruits are in the case, they know the margin at which they can operate.

With the "rowed in" pack there is an even appearance; with the Florodora (diagonal) pack each second fruit is not visible from the outside. Buyers in operating ask for the "11 doz.," "13 doz.," or "16 doz.," cases. The "13 doz." case has, on each side of the partition, 80 fruits—two outside rows with 30 fruits (6×5), and one centre row with 20 fruits (4×5)—or a total of 160 fruits to the case = 13 1-3rd dozen. The "16 dozen" case has 97 fruits on each side of the partition, thus: two outside rows each $6 \times 6 = 72$; one centre row $5 \times 5 = 25$; or a total of 194 fruits, or 16 1-6th dozen.

Buyers, on seeing the neat rows and knowing number of fruits in the case and the size of the fruits, purchase without any uncertainty.

Incidentally (though this is quite apart from the present point) it illustrates the advantages of selling all fruits by number instead of by weight—reducing the elements of uncertainty, to the mutual benefit of grower, wholesaler, and retailer.

—"Fruit World."

The Orchard.

UTILISATION OF LOW-GRADE ORANGES.

In all orange-growing countries, a considerable quantity of fruit of poor quality, when sent to market, gives such small returns as to entail a loss to the grower. In the United States of America, the Federal Department of Agriculture has opened up a new use for waste fruit other than the making of jellies, marmalade, &c. This is the production of sweet-orange oil. Until recently this product was secured wholly from Italy, Sicily, and other parts of Southern Europe. From the "Journal of the Jamaica Agricultural Society," we learn that since 1911 a considerable industry has grown up in the West Indies, and a portion of the annual requirements in the United States is now supplied from that region. In 1914 more than 222,000 dollars (\$44,400) worth of sweet-orange oil was imported. "With the increasing tendency to grade fruit more closely, and to better market conditions, the proportion of culls will doubtless increase rather than decrease," say the Federal investigators. "At present, this low-grade fruit, packed in so-called 'plain wraps,' is sometimes shipped to near-by markets for immediate consumption. The returns are exceedingly small, especially in years when the crop is abundant. At the present time there is, without doubt, enough low-grade fruit available to make possible the extraction of a quantity of orange oil sufficient to supply a considerable portion of the domestic demand.

In order to facilitate their experiments, the Federal workers have perfected a new machine for peeling citrus fruits—one that can be adjusted to handle all sizes from grape-fruit to limes. This machine has been given a public-service patent and dedicated to the public. The investigators found that pressing out the oil, and later, refining it by a simple process, was the method best suited to all conditions involved. The press is inexpensive, and can be made by any mechanic; the still is simple, inexpensive, and can be purchased from many dealers in pharmaceutical and chemical supplies.

Full directions for extracting and refining the oil cannot be given in limited space, but can be obtained by writing to the Federal Department of Agriculture, Office of Drug-Plant and Poisonous-Plant Investigations, Washington, District of Columbia.

After the plant is equipped the cost of producing the oil will depend entirely upon the price paid for waste fruit and the cost of labour. In the experimental work the cost was about 15 cents. for extracting the oil from a standard field box of oranges of approximately 100 lb., and it is believed that on a commercial scale the cost will be no greater for fruit delivered at the factory door.

In commercial experiments with cull fruit obtained at the packing-houses at Orlando, Florida, the average yield of oil per 100 lb. of fruit was about 5 oz. At the average price paid for orange oil during the past ten years the gross returns would be from 47 to 59 cents per field box. The gross return, as determined from actual sales in the markets, of the oil produced in the experimental work was 54 cents per field box.

The cost of extracting the oil from 100 lb. of cull fruit is estimated to be about 15 cents, and the net returns would be from 32 to 44 cents per standard field box, assuming that the fruit is delivered at the factory door.

REJUVENATING OLD FRUIT TREES.

There are numbers of orchards in which the trees have been allowed to run out and become comparatively unproductive. This has usually occurred owing to growers allowing the trees to draw too much on the sap for the development of the top branches. These trees, for the most part, are barren of laterals along the greater length of the leaders, while the top part of the tree resembles the inverted head of a straw broom more than anything else. This dense head has in the course of a few years starved out any laterals that may have been produced. Nevertheless, the great majority of these trees may be brought back by cutting to a state of usefulness in

the course of a season or two. This may be done by putting pressure on the dormant buds along the main arms, and so causing them to break out into new growth. By cutting these branches hard back to points at which considerably smaller branches form perpendicular laterals, the sap flow finds itself jammed back, the lighter growth not being able to accommodate it, with the result that this pressure is placed upon the dormant buds, thus causing them to break and in time form new laterals.

No fruit tree is more amenable to this form of treatment than the peach, and it is surprising how quickly an old tree can be refurnished with a suitable class of fruiting wood by merely cutting back the leaders hard, so as to conduct the sap flow into a new and smaller channel. Trees twenty and thirty years of age have been brought back to productiveness in this manner, but when this is accomplished care must be taken that the faults which rendered this course necessary should not be repeated.

THE ALGAROBIA TREE.

We have frequent inquiries from correspondents concerning the value of the Algarobia tree, especially as to the food value of the beans it produces for stock, and several articles have appeared in this Journal on the subject. From a Hawaiian source we take the following interesting article on this valuable tree, entitled

"THE ALGAROBIA TREE.

"A TREE AUSTRALIA WANTS.

"Although the algarobia, or keawe, is not a native of Hawaii—it was introduced to the islands by Father Bachelot, a French missionary, in 1828—the Hawaiian territory can claim the credit of having discovered the many extraordinary merits of this remarkable tree and of having turned its cultivation for the first time in history to the uses of man. No one knows precisely from what country the algarobia originally came. Little more, indeed, is known of its early history than that a fine ornamental specimen flourished in the Jardin du Roi de Paris in the first quarter of the nineteenth century; and it was from this very tree that Father Bachelot brought the seed which he planted beside the Catholic Cathedral at Honolulu in 1828. Of all the seeds the French missionary planted only one germinated. It rapidly developed into a fine tree, and within a few years it overtopped the cathedral, and covered all the mission buildings with its grateful shade.

"For some decades not a living soul suspected the great part this tree was destined to play in the industrial development of the Hawaiian Islands; and no attempt was made to investigate its habits or to solve the mystery of its rapid spread until algarobia forests actually threatened to displace the indigenous island growths. It was then noted by a local botanist that cattle had been the active instruments of this astonishing phenomenon. Admitted to the mission grounds, they had eaten the beans lying under the famous cathedral tree and carried the seeds up the barren hillsides of extinct craters, to be deposited in crevasses and on elevated coral beds. In these places the seeds, dropped by the mission cattle, had established thick groves of algarobia, covering the once bare lava hillsides with a thick mantle of evergreen, to act as fresh centres of wider distribution through the agency of new generations of live stock.

"Carrying his researches a little further, the botanist discovered that the seed of the algarobia is surrounded with a hard casing like that of a shark's egg, which prevents the seed from being digested by cattle feeding on the bean, and thus ensures its chance of germination when rejected in the cattle excrement in some favouring locality. The first mystery having been solved, later investigators undertook the task of determining the reason of the emphatic predilection exhibited by all sorts of live stock for the bean. The pod was subjected to chemical analysis and the secret was forthwith laid bare. It was found that the bean contains a lot of sugar and a rich proportion of protein, thus rendering it not merely a palatable, but a highly valuable, fodder for all kinds of farm stock. When this discovery was made known the cultivation of the algarobia was no longer left to the unaided and unconscious efforts of the Hawaiian cattle.

"Many settlers were prompt to plant algarobia forests on their ranches and holdings, and the success they met with started a movement which has ever since proceeded uninterruptedly, until at the present time the Hawaiian Islands afford the spectacle of an almost uniform forest covering. The supreme peculiarity of the algarobia is that it is essentially a desert growth. It flourishes best where the soil is poor, the elevation fairly low, and where the rainfall is scanty. These conditions very frequently prevail in the Hawaiian Islands—hence the remarkable spread and

cultivation of this singular tree, which in the course of a generation has converted most of the bleakest Hawaiian deserts into the most valuable land in the territory. The algaroba, however, would never have attained to its full use as a friend of man without the further aid of science.

"The collection and storage of algaroba beans for cattle food had long been an industry of respectable dimensions, when one day (only a few years ago) it occurred to a local chemist to discover if any food values resided in the seed which cattle ate with the pod, but did not digest, for the reasons already stated. The result of his experiments was a convincing demonstration that the seeds hold far more protein than the pod itself. Inventors at once set to work to construct a macerator that would break the seed within the pod, and it was the good fortune of Mr. C. W. Rennear, of Honolulu, to outstrip his competitors and to produce the ideally requisite machine. The effect of this invention was to revolutionise old methods and to turn a comparatively limited activity into a great national industry.

To cite a single apposite illustration there is the case of Molokai. On this island there is a grove of algaroba trees covering 8,300 acres. Before the algaroba was planted there the land was utterly valueless—a piece of bare and uninhabitable desert. The algaroba grove enabled it to support a thriving herd of cattle. The invention of the Rennear machine caused the cattle to be dispensed with and the former desert to become one of the most valuable bits of land in the world. These 8,300 acres produce annually 166,000 tons of beans, which are gathered at a cost of £1 per ton, and have a net sale value after maceration of almost £4 per ton, showing a bulk profit of approximately £600,000 a year.

"The Hawaiian Islands are already exporting large quantities of macerated algaroba beans to North and South America and Asia; some is coming to Australia; and they were beginning also to develop markets in Europe when the war broke out. The value of the algaroba as a fodder tree may be defined in a few words. It bears abundantly within two or three years from the seed, and it can produce a net revenue of £80 an acre from land that is totally and absolutely unfit for any other sort of crop. Surely Australia needs this tree; and as it can be grown with ease in almost every part of Australia from Cape York to the Leeuwin, and is capable of almost immediately transforming our vast desert spaces into profitable cattle pasturages, it is clear that we should lose no time in getting it and making it our own. We have freely given our eucalyptus to all the world; it is a fair thing to acquire the algaroba in exchange.

"But the algaroba is not only useful as a fodder tree. The Americans do not call it the 'most valuable tree in the world' merely because of its fodder uses, but because there is no other tree known to science which is useful for a greater variety of applied human purposes. The flowers of the algaroba tree furnish the most important source of pure honey known in Hawaii—famous throughout the world as 'the Islands of Flowers.'

"The production of honey is a great and growing industry in the territory. It all comes from the algaroba tree, which flowers twice a year and produces two crops of beans annually. Formerly the bee raisers of Hawaii got their bee-ranging rights over the algaroba groves for nothing, but they now have to pay heavily for the exclusive privilege of placing their apiaries in the various forest groves—thus giving the algaroba planter a brand new source of revenue.

"Algaroba wood constitutes, also, the chief source of fuel in the territory. Its growth is so rapid that planters find it highly profitable to thin out all the larger trees at least once a year for sale as fuel, thus continuously making space for the growth of new generations of trees. The wood burns slowly with a strong and steady glow, and it has a calorific value so high that it can be used in factory furnaces in place of coal or coke. The smaller branches make an excellent charcoal.

"As the algaroba is a legume and has a remarkable soil-penetrating power, it is a soil maker of first rate importance.

"The bark of the algaroba contains a large proportion of tannin, and is finding a large use in the leather industry.

"The gum of the algaroba provides a profitable use in the manufacture of varnish.

"The pods of the algaroba are largely and increasingly used in the manufacture of vinegar and denatured alcohol because of their high sugar content.

"The holes of the algaroba tree make excellent piles for use in all coastal waters, both by reason of their toughness and durability and because they are practically immune from the attack of the Toredó worm.

"Finally, the algaroba has a high artistic value as an ornamental growth and as a shade tree, for its form is extremely graceful and spreading, and its foliage is both delicate and beautiful."

Viticulture.

PRACTICAL HINTS IN ESTABLISHING A VINEYARD.—No. 2.

By P. MAHONEY.

PLANTING.

If the land has been duly prepared, the next important thing to consider is

THE SELECTION OF PLANTS.

If the land is of a heavy nature, rooted plants are the best, but cuttings are better than rooted plants in sandy soil. Plants that have been rooted in heavy soil have a decided advantage over those rooted in sandy or light soil, for they generally have more fibrous roots than the latter, which is most essential to plants which have to be transplanted. Plants rooted in sandy soil have a tendency to produce long roots devoid of many serviceable fibrous roots, simply because they can travel further than when in heavy soils.

In planting rooted vines, they require a systematic pruning, which consists in cutting off all fractured roots and making clean cuts of those intended to remain. It is advisable not to have too many strong roots, for some may die back to the detriment of the plant. Clip the points of the fibrous roots, for they might have been badly broken in uprooting. Secondary and lateral roots should never be allowed to cross one another. The top of the plant to be pruned to two buds and a base bud. In coastal districts it is beneficial to make all cuts through a node, for the reason that cutting through the internode exposes the pith, which through excessive moisture, rain or otherwise, decomposes, to the detriment of the bud below.

Roots should only be allowed to grow from the two bottom-most joints of the plant. In the event of the land being prepared, as previously described, it is not necessary to dig holes for the plant until the planting is taking place. When planting, all roots should be spread out and spaced, not permitting too many to go in the same direction. Care should be exercised in seeing that the points of the roots do not curl up, for it is very important that they should be directed downwards, so as to bring them into early contact with the subsoil, which is far richer than the surface soils.

If any fertiliser is given, it should be dug in deeply, so as to encourage the roots to go down. It is a good plan to sow slow-acting manure in the subsoiled furrow where the plant is to go before the furrow is filled in.

Roots are unlike the top of the plant, in that the top can be renovated or re-established at any time. But the roots have to receive their one and only training during the first year or two. Root training is more important than the training of the top of the plant, for it is through

the former that the plant gets its food, and unless the root system is well established the quantity of foodstuff cannot be supplied to the plant and crop, and the plant will, in consequence, never be very profitable.

In the event of cuttings being planted in preference to rooted plants, great care should be exercised in selecting and making them. They should be off thoroughly matured wood, and be made directly after the vines have been pruned. Never should cuttings be got from prunings that have been subjected to frost, for they very often fail to shoot, the frost having deprived them of a considerable amount of sap.

The cuttings should be about 9 or 10 in. long, and should contain a non-pithy septum at the bottom. That is: The cutting is cut off a rod, leaving a section of it on the cutting, thus not exposing the pithy portion, which prevents decomposition and offers no encouragement to white ants.

Cuttings should be short-jointed and consist of no more than five buds, exclusive of the node, which should be cut through to prevent decomposition.

In planting, two cuttings should be planted at the one place, so as to avoid any likely misses. They should be planted far enough apart so that one can be removed without disturbing the other in the event of both striking. Six inches apart is far enough.

A sharp, narrow spade is the best implement to use. It is more satisfactory than a crowbar, which is widely advocated. With a crowbar, very often the soil fails to come in contact with the bottom of the cutting, for it is difficult to press the soil down heavily enough so as to fill in the hole at the bottom, thus leaving air around the bottom of the cutting, which will certainly fail to send out roots from the bottom buds if those conditions prevail. A heavy rain would probably right things. But it might be some time before rain arrived, consequently the roots from the buds near the surface would be the only source of support, thus making the vine a shallow rooter, which should be avoided by using a spade instead of a bar.

The spade has many advantages over the bar; "it's quicker and surer."

To use the spade, it is only necessary to insert it at the required place, push it forward, then insert the cutting at the back, withdraw the spade, and one press of the foot is enough to consolidate the soil around the cutting. They do just as well when planted straight as they do when on the slant. It is not advisable to have the cutting too far out of the ground, for it exposes it too much to the winds and sun, especially if the cutting is slow in making a start, when it is likely to have a big portion of the sap evaporated through exposure. It is not necessary to have the top bud any higher than half an inch above the soil.

To some, all this may seem unnecessary work and useless expense, but it is to be borne in mind that a well-planted vineyard is good for more than one generation, so that it pays to do the thing thoroughly.

(TO BE CONTINUED.)

Tropical Industries.

ARROWROOT—ITS CULTIVATION AND MANUFACTURE.

By THE EDITOR.

Although several papers on arrowroot-growing and on the manufacture of the commercial starch have from time to time been published in the earlier issues of the "Queensland Agricultural Journal," yet, as the present-day subscribers are unable to obtain copies of those journals owing to their being out of print, it is deemed advisable to collate all available information on the industry and present it in pamphlet form to intending arrowroot-growers, from many of whom inquiry is being frequently made as to the prospects of the industry in Queensland.

It is now over fifty years since the industry was first established by the late Mr. George Grimes at Oxley Creek, where he erected the first machinery for manufacturing arrowroot on a commercial scale. As soon as this took place, the writer, who had been growing arrowroot in the same district and manufactured it with most primitive appliances, as will be shown later on, entered more largely into the business of cultivating the plant, and abandoned the manufacture in favour of supplying Mr. Grimes's mill with the raw material, to their mutual benefit.

The bulbs were sold at £2 10s. per ton, and on the then virgin scrub soils between Oxley Creek and Rocklea (then known as the Rocky Waterholes), and on the Brisbane River, the yield was enormous. Two varieties were grown at that period—the Bermuda or *Maranta arundinacea*; and the large purple variety, *Canna edulis*, called in the West Indies "Tousles-mois." These differ materially from each other both in habit of growth and in size, shape, and colour of the bulbs.

The Bermuda plant is diminutive, rarely attaining a greater height than from 3 to 4 ft. The blossom is white, and the tubers, which cluster round the roots, are also white, with a thin shiny skin and bare of rootlets. They adhere to the roots of the plants much in the same manner as potatoes, and are neither very large nor numerous. The starch yielded by the *Maranta* is of excellent quality, and usually commands a higher price in the English market than that of *Canna edulis*. How little actual difference there is between the products of the two varieties is indicated by the following analysis, taking the best Bermuda arrowroot at 2s. per lb. and the Queensland arrowroot (*Canna edulis*) at 3d. per lb.:—

	Bermuda Arrowroot.	Queensland Arrowroot.
Moisture	13.00 to 16.50	17.36
Starch	82.24	81.52
Ash .. ..	.124	.142
Proteids .. ..	.052	.078
Fibre	4.09 to 1.20	.90

The result is, therefore, chemically, about the same, particularly in regard to starch, which is the chief constituent. There is a little more moisture in the Canna, and more fibre in the Maranta. Under the microscope, the Canna arrowroot shows a more silky texture, and the grains are slightly coarser.

The reason why Maranta has never become popular in this State is that it does not yield one-quarter the weight of bulbs, nor is the starch content equal to that of Maranta grown elsewhere, besides which the excess of fibre in this variety makes the matter of treatment more difficult.

A remarkable point about the sale of Queensland, or "Australian Arrowroot," as it is called in England, is that it cannot be sold in Great Britain without some qualifying term attached, such as "Queensland" or "Australian arrowroot." How this has come about is rather interesting. When the Drugs and Food Act was passed by the Imperial Parliament, it was specified that "Arrowroot is the product of the plant *Maranta arundinacea*." That is what Bermuda and Mauritius arrowroots are made from. Manufactured arrowroot from the *Canna edulis* was then practically unknown in Great Britain. I have shown above what little difference there is between the two. It has actually been stated that Queensland arrowroot is an adulterant! Whereas it is generally conceded that, so far from that, it is preferable as a food to the Bermuda product. The purple variety, which is, as said, exclusively cultivated in Queensland, grows to a great height, often rising to 8 ft. or 9 ft. It has very large, broad, ribbed leaves; and as many as 15 to 20 stalks rise from a single stool, each stalk representing a large bulb. In the flowering season the plant sends up a long, straight spike, from the head of which bursts a beautiful bunch of bright scarlet flowers, having the appearance of those of the common Canna known as "Indian Shot," but far larger. The seeds do not often mature, however, as do those of the Canna family generally. The bulbs from which the arrowroot of commerce is prepared form a compact mass on and near the surface of the soil, and so prolific is the plant that I have dug from a single stool as much as 60 lb. and even 80 lb. weight of bulbs.

METHOD OF CULTIVATION—SOIL AND CLIMATE.

It does not follow that because there are, at present, only one or two principal centres of arrowroot manufacture in Queensland, therefore the plant will thrive only in these localities, which are mainly located on the South Coast line, at Pimpama, Coomera, and Ormeau. On the contrary, it grows luxuriantly on all the coast lands—from the Tweed River in the far South to Cooktown in the far North. As to soil, it prefers the rich alluvial scrub lands on river and creek banks, but does very well also on the deep black soils of open country. This refers to the purple variety. The Bermuda plant prefers a more sandy loamy soil, deep, with no clay subsoil. The writer grew both varieties at Oxley on the newly-cleared scrub land bordering that creek, and found that the Maranta (Bermuda) did not thrive well on the rich soil, many plants producing only two or three tubers, 6 or 7 in. long and about 1 in. in diameter. The Purple Canna, on the contrary, grew most luxuriantly, and produced an

enormous quantity of bulbs, which found a ready sale at Mr. Grimes's mill, then located on the Brisbane River.

The climate and rainfall in the districts named were exactly suited to the well-being of the plants, and it is worthy of note that no insect or fungoid pests were ever observable either on leaf, stem, or bulbs. It follows that a deep, rich, well-drained soil and a moderate rainfall are all that is needed to ensure a good crop.

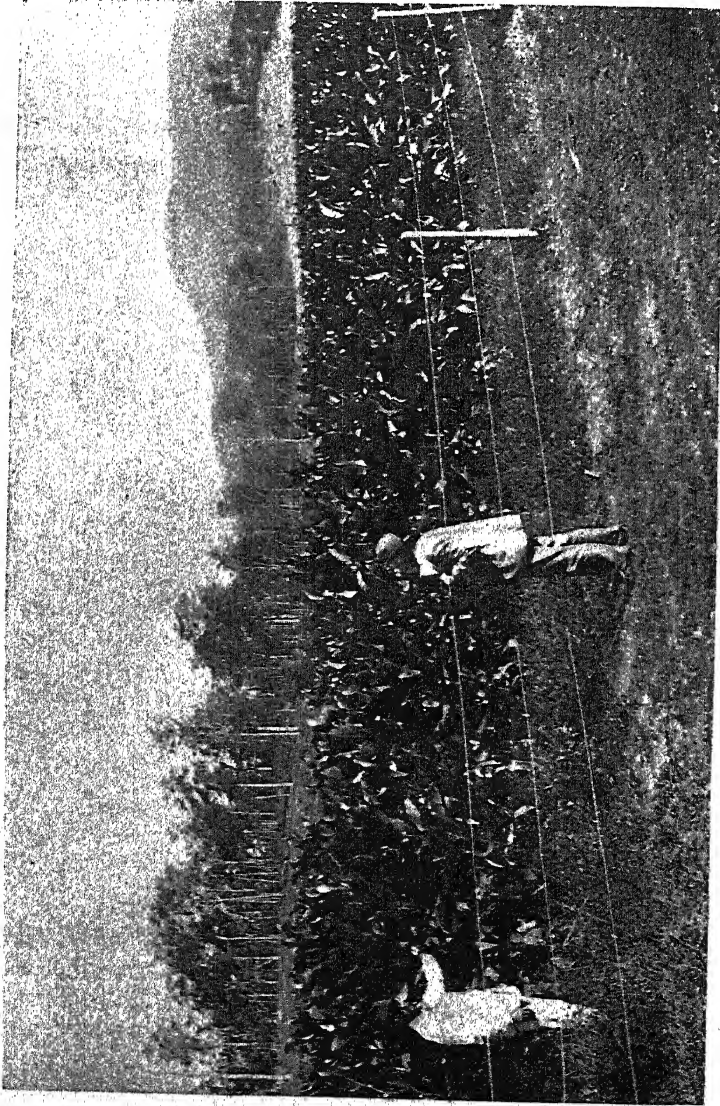


PLATE 6.—FIELD OF ARROWROOT AT PIMPAMA, SIX MONTHS OLD.

The accompanying illustration (Plate 6) represents a well-grown field on the Pimpama River (32 miles from Brisbane), on the property lately belonging to Messrs. Lahey Bros., who had a very extensive manufacturing plant, where cornflour was also prepared.

CULTIVATION.

A visit to some of the arrowroot farms serves to show that there is a similarity among them all, both in preparation of the land, planting, after cultivation, and harvesting.

Where planting takes place in newly burnt-off scrub land, the innumerable stumps, of course, occupy so much of the surface as to preclude any ploughing. It then becomes necessary to dig holes with a sharp mattock or hoe which will cut the roots of the felled trees with which the ground is matted. The rows should be about 6 ft. apart with 4 ft. 6 in. between the holes; but, owing to the presence of stumps, very little regularity can be observed, and the planter must do the best he can as to distances between plants. On open cleared land, where the plough can be used, the proper distances can be observed. The land, in the latter case, should be thoroughly well ploughed, harrowed, and pulverised. Then shallow drills are drawn with the plough about 6 in. deep, and at the regulation distance of 4 ft. 6 in. apart single small bulbs are dropped and covered by turning a furrow over them on each side. On very rich new land, the best results have been obtained by placing the rows 8 ft. apart. As the land becomes poorer, the rows may be closer together, but should not be of a less width than 6 ft. I saw a field lately at Pimpama, on what was once my old sugar plantation (Ormeau), in which the rows were 6 ft. apart, yet in the month of April the plants had spread to such an extent that it was difficult to walk between them.

When the plants are above ground, they must be kept clean as in the case of other crops, and by the time they are about 3 ft. high they will want little further cultivation beyond throwing up a furrow against the roots—hilling up, in fact, as with potatoes. From this time forward, the heavy foliage will soon have covered the ground, thus effectually preventing the growth of weeds.

The planting season extends from August, after the last frosts, to the end of November and even up to January in some late localities. When full grown, a field of *Canna* presents a very pretty sight, the broad leaves of dark-green giving a fine impression of richness and contrasting vividly with the numerous scarlet blossoms to be seen on the plants. From six to eight months—the latter term as a rule—bring the crop to maturity, and a little frost is then beneficial by shrivelling up the tops and concentrating the starch in the bulbs. Supposing the crop ready to harvest in July or in the beginning of August, when one or two frosts have touched the plants, the manufacture should be at once begun, and carried on until the end of October. If the work is protracted into the spring months, the bulbs begin to shoot, and the yield of starch is consequently lessened in quantity and deficient in quality.

HARVESTING.

When the bulbs have come to maturity—that is, in from eight to nine months after planting—and when the plants have, as stated above, had a touch of frost, then is the time to commence the harvest. Mr. D. Lahey, in a paper entitled “When to Harvest Arrowroot,” said:—

“A good test for ascertaining when arrowroot is ready for digging is the following:—Observe the outer leaf of the bulb. A triangular slit will

be noticed pointing downwards. If the slit appears white, the bulb is still immature, but as soon as it turns purple the crop may be harvested. Arrowroot may be left to stand over for two seasons, as in the case of sugar-cane."

The latter statement is important, for it has happened in some cases that, when the crop was larger than the available mill power was capable of dealing with, the growers turned their cattle into the field. Had the crop been held over, it might have been possible to get it in during the next season, and thus avoid a great deal of extra labour.

When harvesting, the stalks are first cut down with a hoe, cane knife, or reaping hook. The stool is then dug up with a strong mattock or a stout-eyed No. 3 grubbing hoe. A spade or fork is quite useless for the work, as the stool has a strong hold of the ground, in addition to which the bulbs of *Canna edulis* cling firmly together by the masses of rootlets proceeding from each bulb. When free from the soil, the bulbs must be separated, and all earth adhering to them knocked off. As soon as dug, they must be carted to the mill; therefore, it is well not to take up more than can be operated on each day. Every day's exposure to the weather or to the hot sun has an injurious effect upon the colour of the manufactured starch.

The average return of a good crop is about 30 cwt. of starch, or five to six times the quantity in tons of bulbs. From 12 to 20 tons per acre have been dug from a field in which the plants were set at distances of 5 ft. between the plants in rows 6 ft. apart. It goes without saying that the yield will vary according to soil, locality, season, good or bad cultivation, and proper washing, grinding, and drying appliances; but, as a general rule, the yield of starch may be set down at from 15 cwt. to 30 cwt. per acre, although, under most exceptional circumstances, it is recorded that as much as 4 tons of finished arrowroot per acre have been obtained. I cannot, however, vouch for this statement.

MACHINERY AND MANUFACTURE.

The machinery employed in the manufacture of arrowroot in the very early days of agriculture in Queensland was as primitive as that used by the ancient Britons for pounding grain or by the Australian natives for crushing the seeds of nardoo. The first growers made use of a grater made by punching holes with a nail in a piece of kerosene tin. Gradually, improvement crept in, until a hand machine was constructed by the writer which much accelerated the work, but was still only a makeshift.

Since that time modern machinery has been introduced capable of turning out from 10 cwt. to 30 cwt. of commercial arrowroot per day. Such a plant may be thus described:—

Motive power, a 6 to 10 h.p. engine, root washers, carriers, grinding mills, cylinders, elevators, rotary sieves, shaker sieves (two), chute, patent circuitous trough (for which Mr. Lahey holds a patent), agitators and sieves, centrifugals for draining, tables, and calico for drying.

The whole of the work, after the tubers have been raised to the highest point of the building, is effected by gravitation. The tubers (or roots as they are erroneously called), as they come from the field, are tipped from the drays on to the carrier, whence they are automatically carried to the tuber-washing trough. Running through the centre of this is a spindle with diagonally inserted pegs of sufficient length to clear the bottom and sides of the trough by about 1 in. Here the bulbs are thoroughly cleaned of all dirt, stones, &c., and they are then passed on to the grater, which is a large, wooden cylinder covered with perforated iron, burred, on to which the bulbs drop from a hopper. A stream of water pours upon this continuously from above, and the pulp and starch held in suspension pass on to a shaking sieve. From this the farina and water pass to a second sieve, the pulp being ejected on the other side of the first sieve. On leaving this sieve, which is perforated with very fine holes, the water and farina are shot into a large trough, where the latter soon settles at the bottom.

When a sufficient quantity for the day's work has passed into the trough, the farina is allowed to settle firmly, and the water is gradually drawn off through a series of taps till the farina is left in a solid mass at the bottom.

Now, it will be seen that the surface of this mass is covered with a dirty slime. This is washed off and is put aside for pig food, as a certain amount of farina is removed with it during the washing. Water is then again admitted, the farina is stirred up with it, and it then passes through a fine silk sieve into the next trough, leaving the first one clear for the following day's work. After further skimming and washing, the now almost clean product passes into the circular trough which runs right round the building. In this there is an agitator, something like the paddle-wheel of a steamer, which revolves and thoroughly stirs up the whole mass.

When the agitation has proceeded for some time, the farina is once more allowed to settle, and a final superficial washing of the mass takes place.

This process does away with all hand-washing—in fact, from the time when the bulbs are emptied from the drays on to the carrier, they are not handled in any way, except to cut off any stalks which may not have been cut off close enough in the field.

The farina is finally dug from the circular trough, and is passed through a centrifugal machine to extract all possible moisture. It is then taken to the drying ground, where it is exposed to the sun on frames covered with calico. Should a shower of rain fall upon it whilst it is drying, the rainwater has the singular effect of turning the farina brown, when it has to be rewashed. Hence the weather must be carefully watched during the drying process. After being thoroughly dried, the farina, which is now brilliantly white, is bagged and put up in various forms for export.

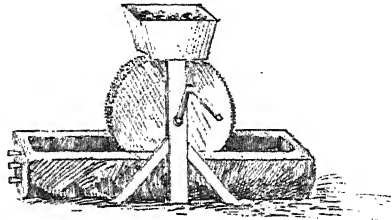
Most mills are constructed on the same plan, and the process is practically the same in all.

It may be interesting here to show how the earliest arrowroot-growers manufactured the farina.

The bulbs were well washed, and all roots pared off. Then they were grated by hand on a grater made of part of a kerosene tin punched full of holes, whose ragged edges served to reduce the bulbs to pulp. This was done over a tub of water. Two or three other tubs covered with calico were provided, and the pulp and farina were separated by working the hand round and round on the calico, water being poured over the mass. The pulp, having been thus separated, was sent to the pigs, and the farina at the bottom of the first tub was well stirred and the water poured off, when the farina passed to the next tub, and so on for three or four washings, when the clean farina was dried on calico frames. This process was necessarily a very slow one, but, as arrowroot was then worth 1s. per lb., it was very remunerative.

The writer improved upon this by constructing the primitive machine here depicted.

A log about 2 ft. in diameter and 8 ft. long was hollowed out by axe and adze to form a trough. At the head of this trough was fixed a framework much like the wooden stand of a grindstone. A large wheel was then cut from a sound log 3 ft. in diameter and 1 ft. wide. Tin plates,



PRIMITIVE HOME-MADE ARROWROOT-MILL.

turned into graters (which required frequent renewal) by punching holes in them with a nail, were next nailed on to the edge of the wheel, to which a wooden axle and handle were fitted. The wheel, when placed in position, turned in the water with which the trough was filled. Above the wheel was a wooden hopper from which the bulbs dropped on to the wheel. This wheel was easily turned by one man, and the grated bulbs dropped into the water in the shape of pulp and farina. The latter gradually settled at the bottom, and the pulp was removed by a narrow-tined fork and by hand. After a short interval to allow the farina to settle down firmly, pegs were withdrawn from the lower end of the trough and the water drawn off. The farina was then dug out of the bottom of the trough, and was passed through calico stretched over a tub. By hand-stirring and at the same time pouring on clean water, the whole of the farina passed through the calico into the tub, leaving the gross impurities behind. This operation was repeated three or four times until the arrowroot was perfectly white and free from any foreign substance.

After the last washing, it was placed on shallow trays or calico frames and dried in the sun. The arrowroot at that time (1863) was readily sold locally at 1s. per lb., and a small quantity sent to London brought 1s. 6d. per lb.

Such a machine to-day would only prove a source of loss to the grower.

With the present up-to-date arrowroot-mills, the whole process—from the digging of the bulbs to the drying of the prepared farina—occupies about twenty-four hours.

It will easily be understood, from what I have written about the process of manufacture, that it is of little use trying to manufacture arrowroot unless there is a plentiful supply of good clean water.

One of the principal growers and manufacturers at Yatala, near Beenleigh, estimated that, when working his mill three days a week and producing about half a ton of arrowroot a day, 24,000 gallons of water were used every eight hours. The refuse fibre and pulp are carted back to the fields and utilised as manure.

Another grower stated that arrowroot gave a monetary return about equal to that from maize and potatoes; but it was a surer crop. It would stand flooding that would kill potatoes, and dry weather would not affect it so adversely as it would eorn. Both these troubles I have experienced, and can quite bear out his statement.

YIELD AND VALUE OF CROP.

The yield of commercial farina may be set down at from 1 to even 2 tons per acre, and the price ranges from £16 to £20 per ton. Late market reports give the price in London at from 7d. to 8d.* per lb.; Bermuda being quoted in October, 1911, at 1s. 7d. per lb.

A considerable item of expense in the manufacture is the cost of firewood, seeing that it takes a cord of wood for each ton of tubers. The tubers contain from 20 to 30 per cent. of starch or 400 to 600 lb. of starch per ton of tubers.

COST OF MACHINERY FOR ARROWROOT AND CORNFLOUR.

Such a mill as I have described would cost, according to capacity, from £500 to £1,200, exclusive of about £200 for the necessary drying and storage sheds. Where cornflour is made, the cost of a mill may run to over £4,000, owing to additional and more complicated machinery for producing this product, although the process is much akin to the manufacture of arrowroot. Briefly, the corn (maize) is first steeped in hot water, and is then ground between large millstones, after which it passes through sieves into huge vats, when it settles, and the gluten remains on the surface. This gluten cannot be washed off without the aid of chemicals.

In the principal arrowroot-growing districts abovementioned there were, in 1916-17, 324 acres planted, mostly in small areas. According to the Government Statistician's annual report published in 1917, the yield of bulbs amounted to 3,506 tons—an average of 10.82 tons per acre—from 3,203 tons of which were produced 663,779 lb. of commercial arrowroot.

* Prices here quoted are probably higher since 1912.

SUGAR PROSPECTS IN THE NORTH.

The General Superintendent of the Bureau of Sugar Experiment Stations has received a report from Mr. A. P. Gibson, the Field Assistant, in which he states that during the month of May he visited the Mossman, Inkerman, Ayr, and Haughton River sugar lands.

At Mossman. Mr. Gibson states, cultivation is improving, but there is still room for an advance in this matter. He is of the opinion that liming and green manuring, combined with subsoiling, is essential. At the time of his visit planting was going on to some extent, the favoured varieties being HQ426, New Guinea 24B, D1135, and New Guinea 15. Subsequent cultivation was not good in many places, the resultant crop becoming entangled by weeds, necessitating burning previous to cutting. The rats have not done so much damage recently, being kept in check by poisoning—cocoanuts being split and dusted with arsenic and distributed about the infested areas. A good deal of the D1135 cane was arrowing. It was expected that 63,000 tons should be treated this season and abundance of labour is at hand for all requirements. Several Mowbray seedlings were inspected, and appeared promising. If the analytical tests are satisfactory, it is expected they will be sent to the Sugar Experiment Station.

At the Lower Burdekin good rains were experienced in the early part of the year, which caused considerable damage. Since then, however, the rainfall has been scanty. The heavy wet at the beginning of the year cut the crushing short and left unharvested about 200,000 tons.

The Inkerman district, which a few years ago was given up to pasturage, now possesses one of the largest and most modern sugar factories in Australia, and is surrounded by something like 176,000 tons of beautiful emerald green canefields. The crop is more than sufficient to keep this mill working full time during the season. It is anticipated that the whole tonnage for the Lower Burdekin district will be 580,000 tons, but it is considered that only about 384,000 tons of this can be crushed. This will, therefore, leave another standover crop of 196,000 tons. If the whole crop could be treated, it would have resulted in something like 72,000 tons of sugar, which would be the biggest yield of any one district in Queensland. Unfortunately, the estimated tonnage is being lessened by crop deterioration.

The Home Hill Government Irrigation Scheme is far from being completed, as great difficulty has been met in securing necessary requirements. The survey lines have been cleared in readiness for the poles which are to carry the electric cables. The making of concrete well-cases is to be commenced very soon, and it is anticipated that the township of Home Hill will be lit up by electricity by the end of the present year.

At Haughton River the growers have an estimated crop of 46,000 tons, 18,000 of which is standover. The growers are working for a sugar factory of their own, and are at the present time negotiating with the owners of Invicta Mill, near Bundaberg, for its purchase. Very fertile land and crops can be seen on the river lands, but Mr. Gibson thinks that this land could be improved and the yield increased, firstly by drainage, and secondly by the application of irrigation, which would have to be obtained from the many magnificent deep lagoons found hereabouts. Insufficient milling power is a drawback to this district at the present time.

KILLING WEEDS IN CANEFIELDS.

An interesting method of killing weeds in sugar-cane fields in Hawaii consists in spreading over the fields, after the dormant canes have been manured, strips of tarred or asphalted felt paper (weighing 9 lb. to the 100 square feet). The pointed shoots of the young cane grow through the paper, which is weighted with stones, and the softer-tipped weeds, failing to penetrate it, are smothered. A similar practice has been employed in England in making lawns. The seed is sown on a treated perishable fabric.

Botany.

ON A PECULAR SUBTERRANEAN FRUITING HABIT OF *VIGNA* *LANCEOLATA*, R. BR., WITH DESCRIPTION OF A NEW VARIETY.

By C. T. WHITE, Government Botanist.

Some years ago Mr. R. E. Soutter, Manager of the State Farm, Bungeworgorai, near Roma, sent to the late F. M. Bailey specimens of a native vetch showing a remarkable subterranean fruiting habit. The specimens were placed away in the herbarium with a query as to the identification; and at the end of last season Mr. Soutter again forwarded specimens to the Department. These enable me to determine it as *Vigna lanceolata*.

Mr. Soutter sends two forms of the plant—one with the typical narrow leaves of *V. lanceolata*, and the other with much broader leaves approaching in this respect to *V. luteola*; this latter I have named *var. latifolia*.*

In answer to inquiries, Mr. Soutter informs us that both forms are indigenous in his locality, and that they both produce seed above and below ground. He says:—"They produce seed above ground in a manner similar to cow-peas, only, of course, the seeds and pods are much smaller; the seeds themselves are dark (mottled), and the flowers yellow." He further states that the plants are greatly relished by stock, and are valuable native fodders.

From a botanical point of view, the observation of bimorphic fructification in *Vigna lanceolata* is particularly interesting, as showing a connecting link between the genera *Vigna* and *Voandzeia*.

In *Arachis hypogaea* (the common Pea Nut or Earth Nut) the flowers are produced above ground in the usual manner, but the pods ripen under the surface of the soil, the pedicels lengthening out after the withering of the flower and development of the ovary, and then turning down and entering the earth.

* *Vigna lanceolata* *var. latifolia*, C. T. White; *varietas nova* foliis rhombicis ovatis ad 3 cm. latis.

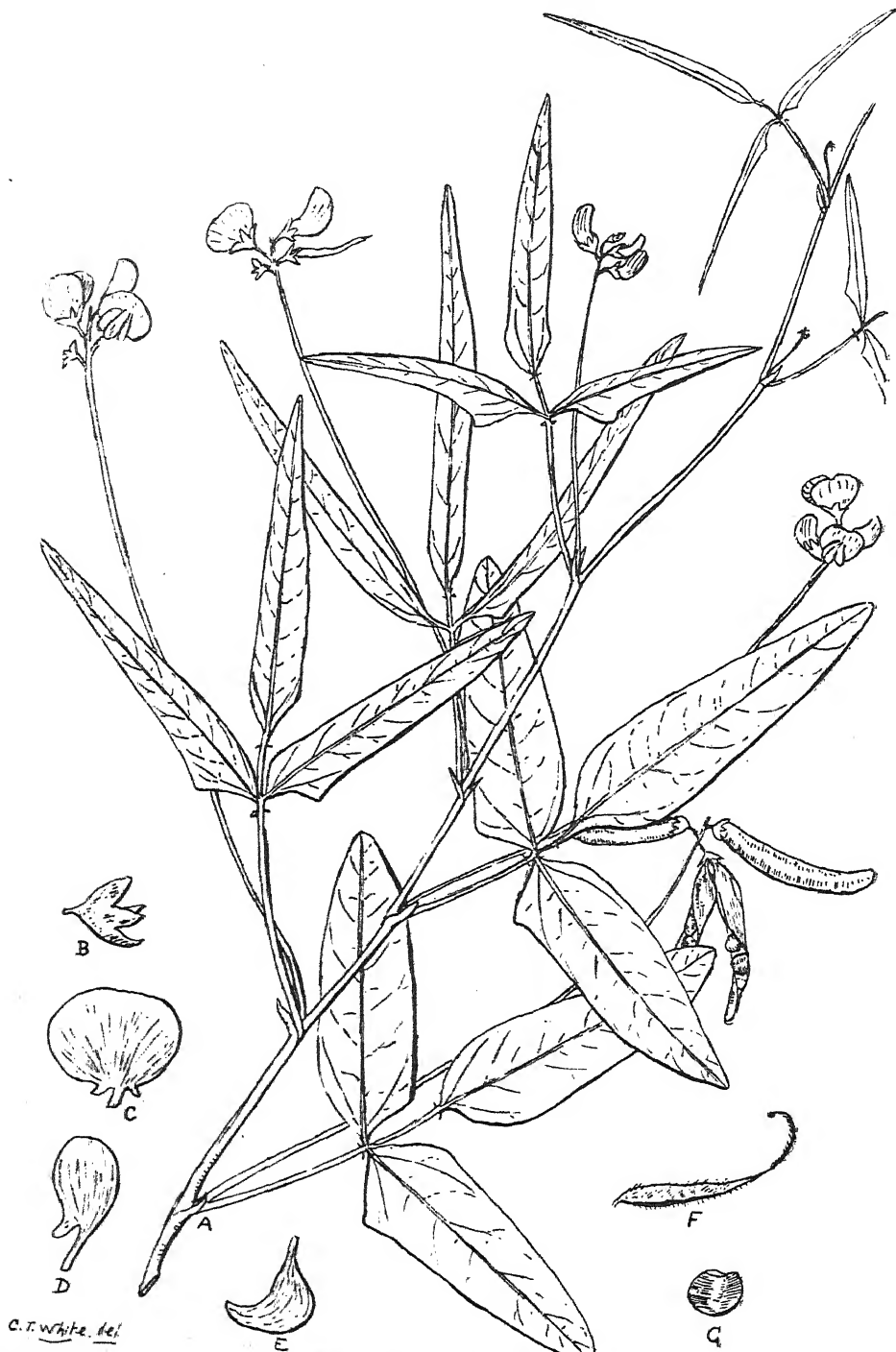


PLATE 7.—*VIGNA LANCEOLATA*.

A. Flowering shoot (natural size).

B. Calyx.

C. Standard.

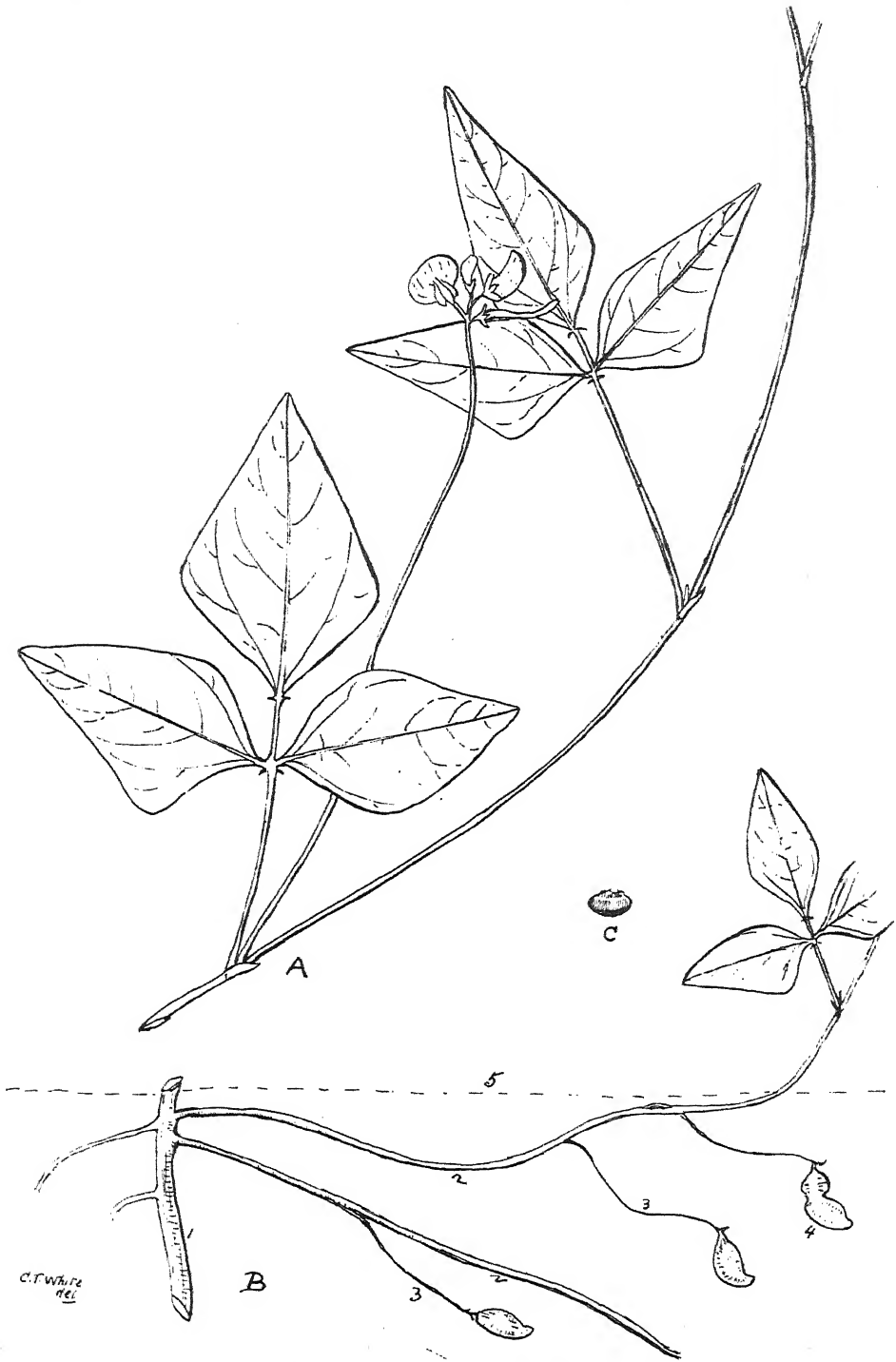
D. Wing petal.

E. Keel petal.

F. Pistil.

G. Seed.

(B and G enlarged.)

PLATE 8.—*VIGNA LANCEOLATA*, var. *LATIFOLIA*.

A. Flowering shoot.

B. Underground shoots.—1, Main stem; 2, Secondary subterranean stems; 3, Pedicels; 4, Pods
5, Ground-line.

C. Seed.

(All natural size.)

The following account by I. H. Burkill in the Kew Bulletin, 1906, page 70, describes the habit of *Voandzeia subterranea* (the Bambarra or African Ground Nut) :—"As the name 'ground nut' implies, the seeds mature under ground. To facilitate the necessary burial of the pod, for none mature that cannot bury [Correa de Mello, in Journ. Linn. Soc. XI., 254], the short, somewhat flattened hairy branches lie prone on the surface of the earth, often penetrating it where soft and always dipping downwards at the tip. On the primary and a few of the secondary branches are a few leaves—large, erect, and trifoliate. The inflorescences, either terminal or from the axils of the leaves, are two-flowered and invariably penetrate the earth unless prevented by some solid body. The flowers thus produced underground—one on each side of a wart-like termination to the axis—may remain subterranean or may reach the surface by the elongation of the pedicel and open as small yellow pea-like blossoms. In fruiting, the ovary is drawn underground. The subterranean flowers—provided, like the aerial, with pedicels—lie folded on to these, and do not develop any of the conspicuous parts; their petals are absent, and so reduced are the stamens that observers have thought them female."

From what I can see by specimens sent of *Vigna lanceolata*, the subterranean fruiting habit is somewhat that of *Voandzeia*—not like that of *Arachis*. Certain of the secondary branches, instead of ascending in the usual manner, enter the soil and extend for some distance underground; flowers are borne here and there on fairly long peduncles in the usual way in axils where normally leaves would develop. The texture of the valves of the pods borne underground is of a thin almost papery nature, not like the firm, tough character of the pods on the same plant borne in the usual manner. Many of these subterranean branches, after travelling some distance underground, emerge and ascend in the usual fashion.

Whether the flowers are throughout the whole of their cycle subterranean, or whether they emerge and are drawn down again into the soil as the ovary develops, I cannot say, but incline strongly to the opinion that they are always subterranean. This point, however, can only be proved by actual observation on the growing plants, which I hope Mr. Soutter will do and communicate at a later date.

In the accompanying plates the first represents a typical specimen of *Vigna lanceolata* with normal fructification; the underground pods are not figured. The second represents the variety *latifolia*, and shows the habit of the subterranean stems, which often extend for a couple of feet or more before emerging, ascending, and flowering, &c., in the normal manner.

Entomology.

CANE GRUB INVESTIGATIONS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigations from the Entomologists, Messrs. J. F. Illingworth and E. Jarvis:—

Attention must again be called to the value of cultural methods as a factor in the control of cane grubs; at the same time correcting some of the statements that appeared, inadvertently, in reporting last month. As was then stated it is still rather early to draw definite conclusions, but the splendid appearance of certain fields, both at Meringa and at Greenhills, is encouraging.

Late planting (October) appears to be of considerable importance for infested areas. If cane is regularly cultivated, the soil is actively worked during the flight and oviposition of the beetles; and from present observations this constant stirring of the soil either deters the beetles from laying their eggs, or if they are laid, breaks up the egg-chambers, which are only a few inches below the surface, and prevents the hatching of the young grubs. At any rate, cane planted in October, this season, is in very good condition in both of the above regions; even though the fields are situated right in the midst of the infested areas, with grub-destroyed cane immediately adjoining.

By cutting these fields late, say, next November or December, it may be possible to ratoon them so as to again avoid an attack of the beetles, for the ploughing and cultivation will coincide with their period of oviposition. We are led to this conclusion from observations at Greenhills, where certain fields, which were cut during last December, situated right in the midst of the infested area, have been successfully ratooned with little apparent injury from the grubs.

We had experiments planned for planting areas at Greenhills both in November and December, this last season, but a rush of cutting and other work made it impossible to get in these experimental plots. Now, however, since the October planting looks so well, we are doubly anxious to see the results of experiments in later planting on soils which will permit working during the rainy season. We shall be very grateful for information from growers who have had any experience with late planting as a means of grub-control.

Though our experiments in summer fallowing were not as complete a success as we could have wished, in either of the districts noted above, due to the rapid development of certain grasses upon the ploughed ground, there was certainly a very decided decrease in the number of grubs turned up by the plough in these plots, as compared with areas that had not been fallowed. Undoubtedly, if the infested fields could

be well worked and kept clean during December, or through the period of oviposition of the beetles, very few eggs would be laid in them, and most of the resulting grubs would be destroyed by subsequent ploughing, preparatory to early planting. Right along this line, we recently had an excellent letter from a grower, who claims that after suffering from the ravages of the grubs for twenty-five years he has at last succeeded in raising a clean crop by having his ground well worked by December, preparatory to early planting. He states that he does not try to ratoon on this infested land, for ratooning multiplies the pest; and that all stand-over cane in the district should be destroyed. We certainly would emphasize the ploughing out of all stand-over cane, for it acts as a breeding ground for all sorts of cane pests.

The facts that allied beetles in America will not deposit their eggs in fields covered with clover led us to experiment with Mauritius beans as a cover crop here. We have not, however, found that this cover offers a complete protection, for upon ploughing the beans under during January a good many grubs turned up. The abundant humus-forming material supplied by the green-crop will, however, undoubtedly supply these grubs, so that they will not do serious harm to the cane which has been recently planted on the land. A possible explanation for the ovipositing of the beetles in these plots is that there was a rather abundant scattering of Natal grass present, and this may have attracted the insects.

LEPIDIOTA FRENCHI IN VIRGIN SOIL.

It is interesting to note the habit of this species in favouring uncultivated areas for ovipositing. One can dig almost anywhere in blady-grass, at this season, and find the grubs. Those of the present year are now in the second stage, and rather small, while last year's grubs are in the third or final stage, and are forming resting cells in which they pupate, preparatory to emergence as beetles next December. The third stage grubs have practically finished their feeding now; but those of the second stage will continue for another year yet, so it is unsafe to use grass-land immediately for cane if the small grubs are found very abundant when ploughing.

NOTES ON LEPIDIOTA ROTHEI.

In a recent report (January) mention was made of the occurrence at Meringa of the small cockchafer *Lepidiota rothei*, Blackburn, in considerable numbers during December and part of January. Although of minor importance as a cane pest it was thought desirable at the time to breed *Rothei* from the egg, in order to determine the duration of its life cycle. This insect emerges about the same time as *frenchi*, from which, however, it differs in being decidedly smaller and of darker colouration. The following brief allusion to the earlier stages of its life cycle may be of interest:—

The eggs are laid from seven to twelve days after copulation, the numbers obtained from individual females confined in cages varying

from four to twelve. Like those of *frenchi*—which they resemble in general appearance—these eggs, although placed close together, are not massed in a single large chamber, but deposited separately, each egg being isolated in a tiny cavity. An interval of from nine to eleven days elapses between the acts of oviposition and emergence of the young grubs; while the first larval stage occupies a period of about ten weeks. This, however, may vary considerably, as in some instances grubs remained four months or longer in the first stage, and in one cage, for example, we found first, second and third stage larvæ derived from eggs hatched together and living under precisely similar conditions in respect to temperature, moisture, and food supply. The interval from second to third instars is about six weeks; and third stage larvæ were obtained from our breeding cages by 28th April.

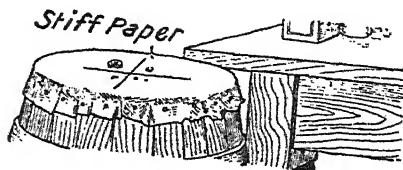
NOTES ON LEPIDIOTA ALBOHIRTA.

Investigations conducted at Meringa on volcanic land suffering from severe grub attack revealed the fact that 10 per cent. of the grubs after having eaten every root were actively devouring the last few inches of stalk still attached to the old sets, the remnants of cane that had been previously bitten off level with the ground. These pieces of stalk were hollowed out and reduced to shell-like fragments, even the hard outside rind being eaten; which would seem to indicate that instead of travelling in search of fresh succulent cane roots the grubs are content to continue feeding on such vegetable tissue as may be readily available even though less palatable.

The remaining 90 per cent. of larvæ unearthed on this occasion had formed cells in the hard soil preparatory to pupating; 70 per cent. of these being found at depths varying from 11 to 18 inches.

SELF-SETTING RAT TRAP.

The ‘S. A. Farmers’ Advocate’ says that a suburbanite successfully trapped a bunch of rats by stretching a piece of stout elastic paper on the top of an open barrel. Spreading food on this paper, he allowed



it to remain until the suspicions of the rats were allayed; then he cut two right-angled slashes in the paper with a razor. Next morning he found seven of the pests in the barrel.

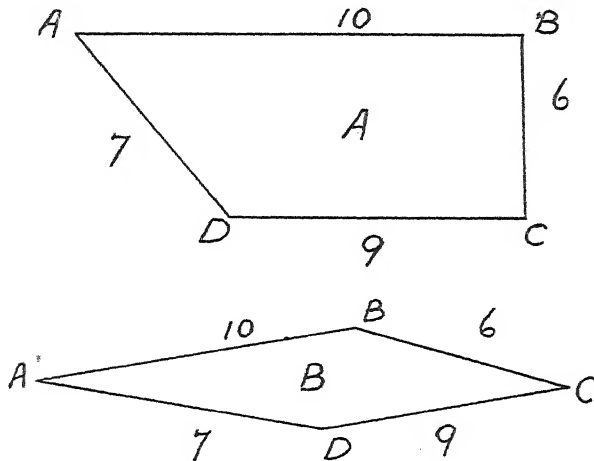
General Notes.

MEASURING LAND WITHOUT THE AID OF INSTRUMENTS.

We have received from two valued correspondents professional criticism of the instructions given in the May issue of the Journal for measuring land without the aid of instruments. Space will not admit of the publication of both explanations, showing where the original formula is faulty, in this issue of the Journal. One of our correspondents writes:—

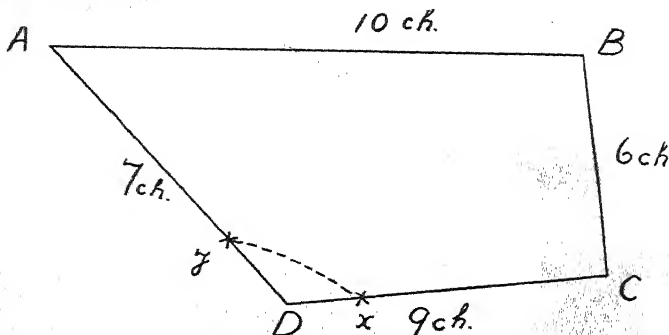
“In the notes on this subject, published in the May issue of the Journal, the writer completely lost sight of the fact that the measurements of the four sides of an area cannot accurately define the shape of that area, and consequently no formula involving the use of the four sides alone can be used to compute the area. Additional data is absolutely necessary.

“This may be seen from the following diagrams of a figure whose sides are 10, 6, 9, and 7 chains long, respectively. It will be noted that in this case $10 + 6 = 9 + 7$. These figures are used designedly to illustrate the absurdity of the method referred to above:—



“It is obvious, on inspection, that the area of figure A (as near a rectangle as possible) is much greater than that of B, and the nearer the angles B and D approach one another the smaller the area enclosed becomes, until with the sides mentioned B and D can meet, and the whole forms one straight line.

“It is necessary, therefore, that (1) a diagonal be measured from either A to C or B to D (preferably both, the one to act as a check upon the other in the final calculation), or (2) one or more angles be measured. As we are still assuming that no instruments are available, other than the chain, the following method of measuring the angles may be adopted:—



“To measure the angle, say, at D, chain a convenient distance ($\frac{1}{2}$ chain or 1 chain) along D C to x , and the same distance along D A to, say, y , then chain $x y$, say, 170 links. This will enable the angle at D to be plotted on paper, but although one angle in a four-sided figure is sufficient, another should be measured to act as a check on the first.

“Such a method of measuring the angles is sometimes necessary when, owing to the presence of a crop, standing timber, or other obstruction, it is impossible to chain the diagonals.

“In cases where a fair amount of accuracy is necessary and the diagonal has been measured, the area of each triangle into which the field has been divided can be calculated (without plotting) by using the formula

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

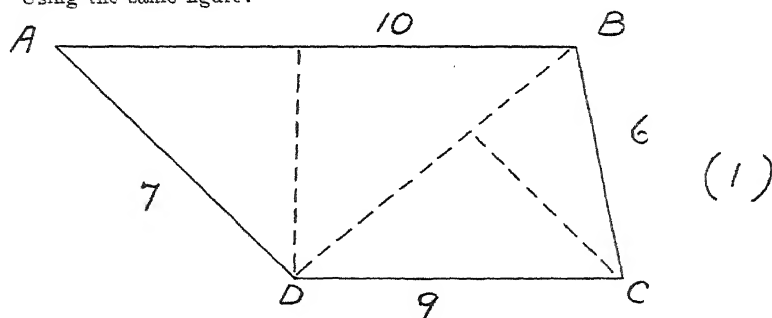
in which s = half the sum of the sides and $a b c$ the respective sides.

“Taking a very simple case, which does not involve fractions, a triangle has sides of 26, 24, and 10 chains, respectively; s then becomes $\frac{1}{2}(26+24+10)=30$. Using the figures instead of letters, we have

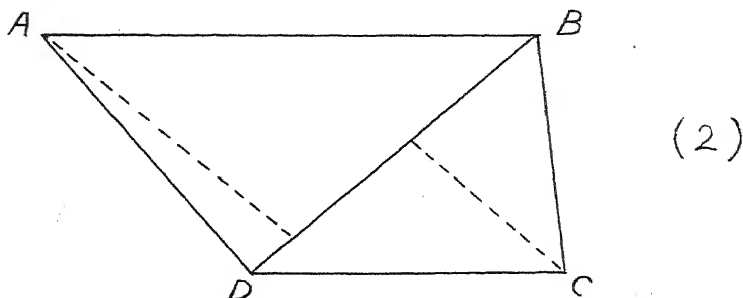
$$\begin{aligned}\text{Area} &= \sqrt{30(30-26)(30-24)(30-10)} \\ &= \sqrt{30 \times 4 \times 6 \times 20} \\ &= \sqrt{14400} \\ &= 120 \text{ sq. ch. or } 12 \text{ acres.}\end{aligned}$$

In cases where only an approximation of the area is required, the easiest way is to plot the figure to a known scale, drop perpendiculars to a convenient side of each triangle and calculate the area of each by multiplying the base by half the height.

“Using the same figure:—



or



Using as a base a measured line as A B in (1) will reduce the margin of error because the measured line is more likely to be accurate than a scaled line.

“There is no doubt that a better knowledge of the areas of the various paddocks and crops will enable the farmer to more correctly gauge the actual yields, and thus conduce to an increased efficiency in agricultural practice.”

Answers to Correspondents.

SPLITTING SHINGLES.

SELECTING A TREE.

In reply to a correspondent asking for instruction in splitting shingles, method of placing them on a roof, &c., a splitter of the olden time writes:—

Shingles, in the days when most houses both in towns and in the country were universally roofed with them, were of Moreton Bay pine and some of the hardwoods. Of the latter ironbark was considered the best, although stringy bark and spotted gum were also used. Good shingles cannot be made from blood wood.

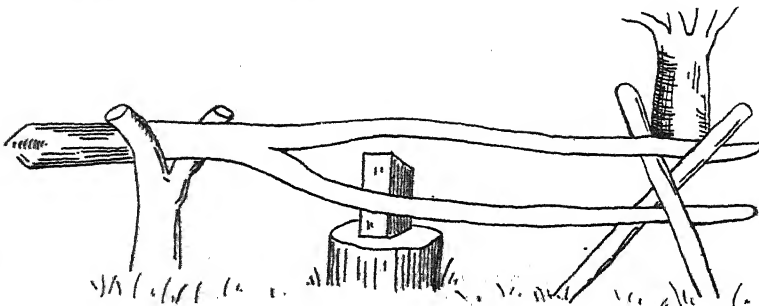
Pine shingles are preferred by some, owing to their lightness and to their not discolouring the water from the roof. Another advantage in their favour is that they do not require boring, as is necessarily the case with hardwood shingles. These latter discolour the rain water for some time after being laid, but they are far more lasting than the former.

The most important matter, and one requiring great judgment and experience, is the selecting of a tree suitable for shingle-splitting. Many old splitters can tell at a glance whether a tree will "run" freely or not by examining the bark of an ironbark or stringy-bark, and, from its corrugations, will judge of the toughness or otherwise of the timber. If the perpendicular corrugations run in parallel lines, the tree will, in all probability, be easy to "burst." If, on the other hand, the lines are interlocked, the timber will probably be the same, and take great labour to open, and then not run evenly; or, if winding, the resulting shingles would be useless, although the tree would not be lost, but might be utilised for fence posts. As a rule, a tree hard to "burst" will "run" more evenly than one which bursts freely. One good way to tell a suitable tree is to cut out a large chip and split it. If it splits freely, it is probable, but not always certain, that the whole tree will split well. It sometimes happens that the chip is hard to split, or is very stringy and interlocked, yet the upper portion of the tree may split well and run evenly, so that, after all, the chip is no certain guide. An experienced splitter can generally tell if a tree is hollow by noticing that some of the broken limbs are hollow, and that sometimes branches shoot out from the main stem almost from top to bottom. Such a tree is pretty sure to have a pipe, which makes it all the easier to split. A tree plentifully besprinkled with large round knots should not be rejected on that account, for such knots are rarely found to extend, which latter is of no use to the shingle-splitter. Suppose the tree to be selected. It should be a good-sized one with a straight barrel, from 2 to 4 ft. in diameter, with a length sufficient to give 16 to 20 good shingle blocks. The larger the girth and the longer the log, the less the labour.

The blocks for shingles are cut off about 15 to 17 in. in length, and are burst into billets of a width of 6 in.

Some preparations are required for splitting shingles.

First, a "horse" has to be erected. This consists of a stout forked sapling with a butt about 3 ft. long and about 6 in. in diameter. This butt is supported against a tree, at a height of about 2 ft. from the ground, on a leaning fork. The two ends of the branches forming the horse are supported by two saplings standing crosswise against another tree as shown in the figure:—



A block is placed on the ground, which serves to support the billet which has to be split into shingles. The splitter has his billets lying handy, and usually piles up a dozen on the left side of the horse. With his shingle "throw" in his left hand and



wooden mallet in the right, he halves the billets, then quarters them, then halves these quarters, and so on until the whole billet is split into shingles about a quarter of an inch thick or even less. The sap shingle is usually thrown away, and no shingle under 3 in. in width is retained, the hearts and outsides being rejected.

Some splitters run each shingle off separately, but this requires judgment, as, when the first shingle is off, the next may run to a thick end, and the third to a thin end, and wedge-shaped shingles are not desirable. The halving and quartering principle is undoubtedly the best.

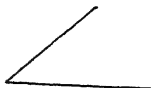
A good splitter will run out 1,000 hardwood or often as many as 2,000 pine shingles in a day's work, but not in an eight-hour day

LAYING ON SHINGLES.


From 400 to 600 shingles will cover a square of roofing. The battens should be about 3 in. apart. The first row on the eave requires to be about half the length of the succeeding rows. The second row will cover the whole of the first. After this, each shingle of the succeeding rows should cover the space between the shingles of the row below it, thus:—



The pitch of the roof should be at about an angle of 45 degrees.



If necessary, the angles of the roof may be made perfectly water-tight by mitreing

the covering shingles  in this shape, the mitred shingles being sawn in half diagonally. The lower part of these shingles must be in line with the rows on both sides.

Hardwood shingles should be bored before nailing on, but both split and sawn pine shingles need not be bored. In nailing on shingles care must be taken that the nail heads of each row of shingles be covered by the shingles in the succeeding row above it.



The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JUNE, 1918.

Article.								JUNE.
								Prices.
Bacon	...	...	...	...	...	...	lb.	9d. to 10d.
Barley	...	...	...	...	...	...	bush.	3s. 6d.
Bran	...	...	...	...	...	...	ton	£6 10s.
Broom Millet	...	...	...	...	...	...	"	£35 to £45
Broom Millet (Sydney price)	...	...	...	...	...	...	"	£95
Butter (First Grade)	...	...	...	...	...	...	cwt.	128s. 6d.
Chaff, Mixed	...	...	...	...	...	...	ton	£6 10s. to £6 11s.
Chaff, Oaten (Imported)	...	...	...	...	...	...	"	£6 10s. to £7 10s.
Chaff, Lucerne	...	...	...	...	...	...	"	£5 15s. to £10
Chaff, Wheaten	...	...	...	...	...	...	"	£5
Cheese	...	...	...	...	...	...	lb.	7½d. to 10½d.
Flour	...	...	...	...	...	...	ton	£12
Hams	...	...	...	...	...	...	lb.	1s. 3d. to 1s. 10d.
Hay, Oaten (Victorian)	...	...	...	...	...	...	ton	£9 10s.
Hay, Lucerne	...	...	...	...	...	...	"	£3 10s. to £5 10s.
Hay, Wheaten	...	...	...	...	...	...	"	£4 to £5 10s.
Honey	...	...	...	...	...	...	lb.	3½d. to 4d.
Maize	...	...	...	...	...	...	bush.	4s. 2d.
Oats	...	...	...	...	...	...	"	4s. 6d.
Onions	...	...	...	...	...	...	ton	£17 10s. to £18 10s.
Peanuts	...	...	...	...	...	...	lb.	4d. to 5d.
Pollard	...	...	...	...	...	...	ton	£6 10s. to £7 10s.
Potatoes	...	...	...	...	...	...	"	£6 to £9
Potatoes (Sweet)	...	...	...	...	...	...	cwt.	2s. 6d. to 2s. 11d.
Pumpkins (Cattle)	...	...	...	...	...	...	ton	£3 15s.
Eggs	...	...	...	...	...	...	doz.	1s. 7d. to 2s. 2d.
Fowls	...	...	...	...	...	...	per pair	3s. 1d. to 12s. 6d.
Ducks, English	...	...	...	...	...	...	"	3s. 1d.
Ducks, Muscovy	...	...	...	...	...	...	"	3s. 8d. to 7s.
Geese	...	...	...	...	...	...	"	6s. to 6s. 6d.
Turkeys (Hens)	...	...	...	...	...	...	"	10s. to 11s. 3d.
Turkeys (Gobblers)	...	...	...	...	...	...	"	15s. 6d. to 22s. 6d.
Wheat (Milling)	...	...	...	...	...	...	bush.	5s. 3d. to 5s. 6d.

VEGETABLES—TURBOT STREET MARKETS.

Beans, per sugar-bag	...	...	...	...	...	...	1s. 6d. to 3s.
Beetroot, per sugar-bag	...	...	...	...	...	...	6d. to 9d.
Cabbages, per dozen	...	...	...	...	...	...	2s. to 5s.
Carrots, per sugar bag	...	...	...	...	...	...	2s. 6d. to 5s.
Cauliflowers, per dozen	...	...	...	...	...	...	8s. to 16s. 3d.
Chokos, per quarter-case	...	...	...	...	...	...	1s. 3d. to 1s. 5d.
Cucumbers, per dozen	...	...	...	...	...	...	1s. to 1s. 6d.
Lettuce, per dozen	...	...	...	...	...	...	1s. to 1s. 6d.
Marrows, per d. zen	...	...	...	...	...	...	2s. to 3s. 6d.
Parsnips, per dozen bundles	...	...	...	...	...	...	6d. to 1s.
Peas, per sugar-bag	...	...	...	...	...	...	6s. to 9s. 6d.
Sweet Potatoes, per cwt.	...	...	...	...	...	...	2s. 9d. to 2s. 10d.
Table Pumpkins, per cwt.	...	...	...	...	...	...	3s. to 3s. 6d.
Tomatoes, per quarter-case	...	...	...	...	...	...	2s. to 5s. 9d.

SOUTHERN FRUIT MARKETS.

Article.	JUNE.	
	Prices.	
Bananas (Queensland), per case	12s. to 17s.	
Bananas (Tweed River), per case	14s. to 21s.	
Bananas (Fiji), per bunch... ..	7s. to 8s. 5d.	
Bananas (G.M.), per bunch	7s. to 8s. 5d.	
Bananas (G.M.), per case	20s. to 23s.	
Lemons (local), per bushel-case	5s. to 6s.	
Mandarins, per bushel-case	8s.	
Oranges (Navel), per case	2s. 6d. to 9s.	
Papaw Apples, (Queensland), per quarter-case	8s.	
Passion Fruit, per half-case	11s.	
Persimmons, per half bushel-case	2s. 6d. to 4s. 6d.	
Pineapples (Queens), per double-case	9s. to 11s.	
Pineapples (Ripleys), per double-case	8s. to 9s.	
Tomatoes (Queensland), per half-case	2s. to 4s.	

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	JUNE.	
	Prices.	
Apples, Eating, per case	7s. to 10s. 6d.	
Apples, Cooking, per case... ..	8s. to 10s. 6d.	
Apricots, per case ... ..	...
Bananas (Cavendish), per dozen	2d. to 5½d.	
Bananas (Sugar), per dozen	4d. to 5½d.	
Cape Gooseberries, per small box ... ..	...
Citrons, per hundredweight	8s.	
Cocoanuts, per sack	15s. to 25s.	
Cumquats, per quarter-case	3s. to 3s. 6d.	
Custard Apples, per tray	2s. to 5s. 6d.	
Lemons (Lisbon), per quarter-case	3s. 6s. to 8s.	
Mandarins, per case	7s. 6d. to 10s.	
Mangoes, per quarter-case	7s. to 12s.	
Oranges (Navel), per case	6s. 6d. to 8s. 6d.	
Oranges (Seville), per case	14s.	
Oranges (Other), per case	3s. to 4s. 6d.	
Papaw Apples, per quarter-case	2s. to 3s.	
Passion Fruit, per half-bushel case	6s. to 7s. 6d.	
Peaches, per quarter-case ... ..	...
Pears, per half-bushel case ... ..	...
Peanuts, per lb.	4d. to 5d.	
Persimmons, per quarter-case	1s. 8d. to 2s. 6d.	
Pineapples (Ripley), per dozen	1s. to 2s.	
Pineapples (Rough), per dozen	6d. to 1s.	
Pineapples (Smooth), per dozen	1s. to 2s. 6d.	
Plums, per quarter-case ... ..	...
Pomelo (poor man's orange) per case	9s. to 13s.	
Rockmelons, per dozen ... ..	...
Rosellas, per sugar bag	3s. 6d. to 5s.	
Tomatoes, per quarter-case	2s. to 3s. 6d.	
Strawberries, per dozen boxes	4s. to 10s.	

TOP PRICES, ENOGGERA YARDS, MAY, 1918.

Animal.	MAY.	
	Prices.	
Bullocks	£18 to £23	
Cows	£13 7s. 6d. to £18 2s. 6d.	
Cows (Single) ... ..	...
Merino Wethers	41s. 3d.	
Crossbred Wethers	49s. 6d.	
Merino Ewes	35s.	
Crossbred Ewes	37s.	
Lambs	40s. 3d.	
Pigs (Baconers) ... ..	...
Pigs (Porkers)	45s. 9d.	
Pigs (Slips)	24s. 6d.	

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MAY, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MAY, 1918 AND 1917, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	May.	No. of Years' Records.	May, 1918.	May, 1917.		May.	No. of Years' Records.	May, 1918.	May, 1917.
<i>North Coast.</i>					<i>South Coast— continued:</i>				
	In.		In.	In.		In.		In.	In.
Asherton	2.13	17	2.24	3.26	Nambour	4.91	22	6.59	3.60
Cairns	4.49	36	3.81	2.39	Nanango	1.67	36	0.48	0.46
Cardwell	3.60	46	2.01	3.56	Rockhampton	1.54	31	1.02	1.09
Cooktown	2.96	42	1.18	1.47	Woodford	2.90	31	2.75	0.66
Herberton	1.65	31	0.91	3.83					
Ingham	3.48	26	2.20	3.75					
Innisfail	12.45	37	7.36	17.49					
Mossman	2.52	10	1.18	4.70					
Townsville	1.39	47	0.01	2.40					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
					Dalby	1.35	48	0.24	0.03
Ayr	1.20	31	0.04	2.66	Emu Vale	1.21	...	0.31	0.11
Bowen	1.39	47	0.26	1.51	Jimbour	1.28	...	0.16	Nil
Charters Towers	0.82	36	Nil	1.35	Miles	1.70	33	0.32	0.06
Mackay	3.89	47	2.04	1.63	Stanthorpe	1.98	45	0.27	0.15
Proserpine	5.35	15	5.08	2.39	Toowoomba	2.35	46	0.78	0.37
St. Lawrence	1.87	47	1.33	1.01	Warwick	1.67	31	0.23	Nil
<i>South Coast.</i>					<i>Maranoa.</i>				
					Roma	1.57	44	0.06	Nil
Biggenden	1.97	...	0.76	0.92					
Bundaberg	2.78	35	1.01	1.84					
Brisbane	2.90	67	2.49	0.48					
Childers	2.44	23	1.01	1.69					
Grohamburst	5.00	25	5.09	2.47					
Esk	2.14	31	0.53	0.25					
Gayndah	1.63	47	0.54	1.09					
Gympie	3.09	48	1.91	1.61					
Glasshouse M'tains	3.33	10	3.33	2.18					
Kilkivan	2.02	39	0.98	0.77					
Maryborough	3.12	47	1.95	2.54					
					<i>State Farms, &c.</i>				
					Bungewongorai	0.65	4	0.05	0.02
					Gatton College	1.87	...	1.02	0.15
					Gindie	1.10	...	1.84	0.10
					Hermitage	1.30	...	0.23	0.02
					Kairi	1.69	4	1.65	2.95
					Kamerunga	4.32	...	3.45	2.55
					Sugar Experiment Station, Mackay	3.68	...	...	2.99
					Warren	0.37	4	0.53	0.17

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for May this year, and for the same period of 1917, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

Farm and Garden Notes for August.

This and the following two months are about the busiest periods of the year so far as work in the field is concerned; and the more activity now displayed in getting in the summer crops, the richer will be the reward at harvest time. Potatoes should be planted, taking care to select only good, sound seed that has sprouted. This will ensure an even crop. Yams, arrowroot, ginger, sisal hemp, cotton, and sugar-cane may now be planted. Sow maize for an early crop. If the seed of prolific varieties is regularly saved, in the end it will not be surprising to find from four to six cobs on each stalk. This has been the experience in America, where the selecting of seeds has been reduced to a fine art.

In choosing maize for seed, select the large, well-filled, flat grains. It has been shown that, by constantly selecting seed from prolific plants, as many as five and six cobs of maize can be produced on each stalk all over a field. A change of seed from another district is also beneficial. Sow pumpkins, either amongst the maize or separately, if you have the ground to spare. Swede turnips, clover, and lucerne may be sown, but they will have to contend with weeds, which will begin to vigorously assert themselves as the weather gets warmer; therefore, keep the hoe and cultivator constantly going in fine weather. Tobacco may be sown during this month. If vines are available, sweet potatoes may be planted towards the end of the month. In this case also it is advisable to avoid too frequent planting of cuttings from the old vines; and to obtain cuttings from other districts. If grasses have not yet been sown, there is still time to do so, if the work be taken in hand at once. Sugar-cane crushing will now be in full swing, and all frosted cane in the Southern district should be put through the rollers first. Plough out old canes, and get the land in order for replanting. Worn-out sugar lands in the Central and Northern districts, if not intended to be manured and replanted, will bear excellent crops of sisal hemp. Rice and coffee should already have been harvested in the North. The picking of Liberian coffee, however, only begins this month. Collect divi-divi pods. Orange-trees will be in blossom, and coffee-trees in bloom for the second time. As this is generally a dry month in the North, little can be done in the way of planting.

Kitchen Garden.—Nearly all spring and summer crops can now be planted. Here is a list of seeds and roots to be sown, which will keep the market gardeners busy for some time: Carrots, parsnips, turnip, beet, lettuce, endive, salsify, radish, rhubarb, asparagus, Jerusalem artichoke, French beans, runner beans of all kinds, peas, parsley, tomato, egg-plant, sea-kale, cucumber, melon, pumpkin, globe artichokes. Set out any cabbage plants and kohlrabi that are ready. Towards the end of the month plant out tomatoes, melons, cucumbers, &c., which have been raised under cover. Support peas by sticks or wire-netting. Pinch off the tops of broad beans as they come into flower to make the beans set. Plough or dig up old cauliflower and cabbage beds, and let them lie in the rough for a month before replanting, so that the soil may get the benefit of the sun and air. Top dressing, where vegetables have been planted out, with fine stable manure has a most beneficial effect on their growth, as it furnishes a mulch as well as supplies of plant food.

Flower Garden.—All the roses should have been pruned some time ago, but do not forget to look them over occasionally, and encourage them in the way they should go by rubbing off any shoots which tend to grow towards the centre. Where there is a fine young shoot growing in the right direction, cut off the old parent branch which it will replace. If this work is done gradually it will save a great deal of hacking and sawing when next pruning season arrives. Trim and repair the lawns. Plant out antirrhinums (snapdragon), pansies, hollyhocks, verbenas, petunias, &c. Sow zinnias, amaranthus, balsam, chrysanthemum, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins; and plant gladiolus, tuberose, amaryllis, panacratium, ismene, crinum, belladonna, lily, and other bulbs. In the case of dahlias, however, it will be better to place them in some warm moist spot, where they will start gently and be ready to plant out in a month or two. It must be remembered that this is the driest of our months. During thirty-eight years the average number of rainy days in August was seven, and the mean average rainfall was 2.63 inches, and for September 2.07 inches, increasing gradually to a rainfall of 7.69 inches in February.

Orchard Notes for August.

THE SOUTHERN COAST DISTRICTS.

The remarks that have appeared in these notes during the last few months respecting the handling and marketing of citrus fruits apply equally to the present month. The bulk of the fruit, with the exception of the latest ripening varieties in the latest districts, is now fully ripe, and should be marketed as soon as possible, so that the orchards can be got into thorough order for the spring growth. All heavy pruning should be completed previous to the rise in the sap; and where winter spraying is required, and has not yet been carried out, no time should be lost in giving the trunks, main branches, and inside of the trees generally a thorough dressing with the lime and sulphur wash.

Where there are inferior sorts of seedling citrus trees growing, it is advisable to head same hard back, leaving only the main trunk and four or five well-balanced main branches cut off at about 2 ft. from the trunk. When cut back, give a good dressing with the lime and sulphur wash. Trees so treated may either be grafted with good varieties towards the end of the month or early in September; or, if wished, they may be allowed to throw out a number of shoots, which should be thinned out to form a well-balanced head, and when large enough should be budded with the desired variety.

Grafting of young stock in nursery, not only citrus but most kinds of deciduous fruits, can be done this month. It comes in useful in the case of stocks that have missed in budding, but for good, clean-grown stocks budding is to be preferred.

In the case of working our Seville orange stocks to sweet oranges, grafting is, however, preferable to budding, as the latter method of propagation is frequently a failure. The Seville stock should be cut off at or a little below the surface of the ground. If of small size, a single tongue graft will be sufficient; but if of large size, then the best method is the side graft—two or more grafts being placed in each stock, so as to be certain of one taking. In either case the grafts are tied firmly in place, and the soil should be brought round the graft as high as the top bud. If this is done, there will be few missed, and undesirable Seville stocks can be converted into sweet oranges.

In selecting wood for grafting, take that of the last season's growth that has good full buds and that is well matured; avoid extra strong or any poor growths.

Seville oranges make good stocks for lemons. In case it is desirable to work them on to lemons, it is not necessary to graft below ground, as in the case of the sweet orange, but the stock can be treated in the same manner as that recommended in the case of inferior oranges—viz., to head hard back, and bud on the young shoots.

Where orchards have not already been so treated, they should now be ploughed so as to break up the crust that has been formed on the surface during the gathering of the crop, and to bury all weeds and trash. When ploughed, do not let the soil remain in a rough, lumpy condition, but get it into a fine tilth, so that it is in a good condition to retain moisture for the trees' use during spring. This is a very important matter, as spring is our most trying time, and the failure to conserve moisture then means a failure in the fruit crop to a greater or less extent.

Where necessary, quickly acting manures can be applied now. In the case of orchards, they should be distributed broadcast over the land, and be harrowed or cultivated in; but in the case of pines they should be placed on each side of the row, and be worked well into the soil.

The marketing of pines, especially smooths, will occupy growers' attention, and where it is proposed to extend the plantations the ground should be got ready, so as to have it in the best possible condition for planting, as the thorough preparation of the land prior to planting pines is money very well spent.

The pruning of all grape vines should be completed, and new plantings can be made towards the end of the month. Obtain well-matured, healthy cuttings, and plant them in well and deeply worked land, leaving the top bud level with the surface of the ground, instead of leaving 6 or 7 in. of the cutting out of the ground

to dry out, as is often done. You only want one strong shoot from your cutting, and from this one shoot you can make any shaped vine you want. Just as the buds of the vines begin to swell, but before they burst, all varieties that are subject to black spot should be dressed with the sulphuric acid solution—viz., three-quarters of a pint of commercial sulphuric acid to one gallon of water; or, if preferred, this mixture can be used instead—viz., dissolve 5 lb. of sulphate of iron (pure copperas) in one gallon of water, and when dissolved add to it half a pint of sulphuric acid.

THE TROPICAL COAST DISTRICTS.

Bananas should be increasing in quality and quantity during the month, and though, as a rule, the fruit fly is not very bad at this time of the year, still it is advisable to take every care to keep it in check. No over-ripe fruit should be allowed to lie about in the gardens, and every care should be taken to keep the pest in check when there are only a few to deal with, as, if this is done, it will reduce the numbers of the pest materially later on in the season. The spring crop of oranges and mandarins will be now ready for marketing in the Cardwell, Tully, Cairns, and Port Douglas districts. For shipping South see that the fruit is thoroughly sweated, as unless the moisture is got rid of out of the skins the fruit will not carry. Should the skins be very full of moisture, then it will be advisable to lay the fruit on boards or slabs in the sun to dry; or, if this is not possible, then the skin of the fruit should be artificially dried by placing same in a hot chamber, as the moisture that is in the skin of our Northern-grown citrus fruits must be got rid of before they will carry properly.

Papaws and granadillas should be shipped South, and the markets tested. If carefully packed in cases holding only one layer of fruit, and sent by cold storage, these fruits should reach their destination in good order. Cucumber and tomato shipments will be in full swing from Bowen. Take care to send nothing but the best fruit, and don't pack the tomatoes in too big cases, as tomatoes always sell on their appearance and quality.

THE SOUTHERN AND CENTRAL TABLELANDS.

All fruit-tree pruning should be finished during the month, and all trees should receive their winter spraying of the lime and sulphur wash.

All new planting should be completed, orchards should be ploughed and worked down fine, and everything got ready for spring.

In the warmer parts, grape pruning should be completed, and the vines should receive the winter dressing for black spot. In the Stanthorpe district grape pruning should be delayed as late as possible, so as to keep the vines back, as it is not early but late grapes that are wanted, and the later you can keep your vines back the better chance they have of escaping spring frosts.

Towards the end of the month inferior varieties of apples, pears, plums, &c., should be worked out with more desirable kinds; side, tongue, or cleft grafting being used. In the case of peaches, almonds, or nectarines, head back and work out by budding on the young growth.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	MAY.		JUNE.		JULY.		AUGUST.		PHASES OF THE MOON.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
	6 13	5 17	6 30	5 0	6 39	5 3	6 30	5 18	<p>The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.</p>
	6 14	5 16	6 30	5 0	6 39	5 3	6 30	5 18	
3	6 14	5 15	6 31	5 0	6 39	5 4	6 29	5 19	<p>H. M.</p> <p>4 May ☾ Last Quarter 8 26 a.m.</p>
4	6 15	5 14	6 31	5 0	6 39	5 4	6 29	5 19	<p>10 " ● New Moon 11 1 p.m.</p>
5	6 15	5 13	6 32	5 0	6 39	5 4	6 28	5 20	<p>18 " ☾ First Quarter 6 14 a.m.</p>
6	6 16	5 13	6 32	5 0	6 39	5 5	6 27	5 20	<p>26 " ○ Full Moon 8 32 a.m.</p>
7	6 16	5 12	6 33	5 0	6 39	5 5	6 27	5 21	<p>The Moon will be nearest the earth on the 8th, and farthest from it on the 20th.</p>
8	6 17	5 11	6 33	5 0	6 39	5 6	6 26	5 21	
9	6 17	5 11	6 34	5 0	6 39	5 6	6 25	5 22	<p>2 June ☾ Last Quarter 2 20 p.m.</p>
10	6 18	5 10	6 34	4 59	6 39	5 7	6 24	5 22	<p>9 " ● New Moon 8 3 a.m.</p>
11	6 19	5 9	6 35	4 59	6 39	5 7	6 23	5 23	<p>16 " ☾ First Quarter 11 12 p.m.</p>
12	6 19	5 9	6 35	4 59	6 39	5 8	6 22	5 24	<p>24 " ○ Full Moon 8 38 p.m.</p>
13	6 20	5 8	6 36	4 59	6 38	5 8	6 21	5 24	<p>The Moon will be nearest the earth on the 5th, and farthest from it on the 17th. It will be 12 times its diam. north of the planet Uranus on the 1st at 7 30 p.m.</p>
14	6 20	5 8	6 36	4 59	6 38	5 9	6 20	5 25	<p>There will be a very partial Eclipse of the Moon on the 24th June, commencing about 7 46 p.m. and ending about 9 10 p.m.</p>
15	6 21	5 7	6 36	5 0	6 38	5 9	6 19	5 26	
16	6 21	5 6	6 37	5 0	6 38	5 10	6 19	5 26	
17	6 22	5 6	6 37	5 0	6 37	5 10	6 18	5 27	
18	6 23	5 5	6 37	5 0	6 37	5 11	6 17	5 27	
19	6 23	5 5	6 38	5 0	6 37	5 11	6 16	5 28	<p>1 July ☾ Last Quarter 6 43 p.m.</p>
20	6 24	5 4	6 38	5 0	6 36	5 12	6 15	5 28	<p>8 " ● New Moon 6 22 p.m.</p>
21	6 24	5 4	6 38	5 1	6 36	5 12	6 14	5 29	<p>16 " ☾ First Quarter 4 25 p.m.</p>
22	6 25	5 3	6 39	5 1	6 36	5 13	6 13	5 29	<p>24 " ○ Full Moon 6 35 a.m.</p>
23	6 25	5 3	6 39	5 1	6 35	5 13	6 12	5 30	<p>30 " ☾ Last Quarter 10 14 p.m.</p>
24	6 26	5 3	6 39	5 1	6 35	5 14	6 11	5 30	<p>The Moon will be farthest from the earth on the 15th, and nearest on the 27th.</p>
25	6 26	5 2	6 39	5 1	6 34	5 14	6 10	5 30	
26	6 27	5 2	6 39	5 2	6 34	5 15	6 9	5 31	<p>7 Aug. ● New Moon 6 30 a.m.</p>
27	6 27	5 2	6 39	5 2	6 33	5 15	6 8	5 31	<p>15 " ☾ First Quarter 8 16 a.m.</p>
28	6 28	5 1	6 39	5 2	6 33	5 16	6 7	5 32	<p>22 " ○ Full Moon 3 2 p.m.</p>
29	6 28	5 1	6 39	5 2	6 32	5 16	6 6	5 32	<p>29 " ☾ Last Quarter 5 27 a.m.</p>
30	6 29	5 1	6 39	5 3	6 32	5 17	6 5	5 33	<p>The Moon will be farthest from the earth on the 12th, and nearest to it on the 24th.</p>
31	6 29	5 0	...	...	6 31	5 17	6 4	5 33	

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during May, June, and July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night, when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

QUEENSLAND AGRICULTURAL JOURNAL

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AUGUST, 1918.

PART 2.

Agriculture.

THE AUSTRALIAN WHEAT YIELD FOR 1917-18.

The Australian wheat yield for 1917-18 has been estimated at 116,058,315 bushels, of which New South Wales has produced 37,842,930 bushels; Victoria, 37,737,552 bushels; South Australia, 28,692,594 bushels; Western Australia, 10,000,000 bushels; Queensland, 1,405,664 bushels; Tasmania, 379,575 bushels. Of the Australian 1915-16 crop there are 6,708,000 bushels held by shippers and 267,000 bushels by millers. Of the 1916-17 crop, shippers hold 93,933,000 bushels, and millers 3,309,000 bushels. Of the 1917-18 crop, shippers hold 82,941,000 bushels, and millers 12,807,000 bushels. Not allowing for that destroyed by mice and weevil, there should be now in Australia 66,655,000 bags, or in round figures 200,000,000 bushels of wheat, which, at only 4s. per bushel, would be worth £40,000,000. If it could be shipped it would be worth very much more. On 3rd June the Australian Wheat Board had an overdraft of £10,763,000. Of this the New South Wales amount was £3,249,000; that of Victoria, £3,597,000; South Australia, £3,399,000; Western Australia, £518,000.

On the 30th May a cargo of about 2,200 tons of wheat in the schooner Betsy Ross left Melbourne for the United States. This vessel is the first to sail of the fleet of American and Canadian sailing vessels, detained in Melbourne pending the completion of negotiations with regard to the carriage of Australian wheat to the United States.—Producers' Agency.

CULTIVATION OF LINSEED FOR OIL PRODUCTION.

The following facts have been collected by Messrs. Meggitt Limited, Sydney (whose advertisement *re* linseed meal, &c., appears in another page of this issue of the "Journal"), with a view of helping farmers in the production of linseed for oil milling. The production of flax entails a different treatment, and is entirely another proposition.

Linseed is grown extensively in Argentine, Canada, India, America, and Russia. It may be argued that linseed might do well in the above countries, and yet prove an unsatisfactory enterprise in Australia. So far as we can ascertain, there does not appear to be any reason why linseed should not do well and prove at least as profitable as wheat in the greater part of the country which is now chiefly occupied in production of that cereal.

All the countries which produce linseed in any quantity are also great wheat-producing countries. Although it may be argued that the demand for linseed would be purely local, it must be apparent to thinking people that there is just as wide a world market for linseed as there is for wheat. Our requirements will approximate 18,000 tons per year.

In 1913 the gross linseed imports into the United Kingdom for twelve months to 31st December, were 3,274,000 quarters, and the total American imports of linseed (official) for 1914, 1915, and 1916, respectively, were 231,163 tons, 370,909 tons, and 327,451 tons.

There is no area in the United States in which flax is grown as a dual purpose crop—that is, producing both linseed and flax. Practically all the area is devoted to the production of seed alone. Straw from some areas is utilised in the manufacture of tow, which is used in the making of upholstery tow, insulation boards, certain types of rugs, and, to some extent, in the making of coarse papers. Just at the present time it is being utilised principally, we believe, in the manufacture of oakum.

SOIL.

Any land that will grow wheat, oats, and like crops will grow linseed. Avoid boggy, wet land; don't use rich land—soil well cropped out will give good results. Grown as a rotation crop once in about seven, it will do the soil a lot of good, and the land will grow better crops after it. When grown upon sandy soils the difficulty is that the crop is too dependent upon frequent rainfall for the necessary moisture, since there is so little available water stored in such a soil.

PLOUGHING.

Plough to the depth of about 7 inches, then work the soil to a fine tilth, making the surface smooth and even.

SOWING.

Sow broadcast. This can be done effectively with the drill by taking off the points and fixing a board under the cups; the seed dropping on the board is cattered evenly over the ground. Slant the board to throw from the machine to the back.

There appears to be a diversity of opinion as to the quantity of seed to be sown per acre. The Department of Agriculture of New South Wales advise 30 lb. to 40 lb. per acre, whereas the "Farmers' Bulletin," published by the United States, America, Department of Agriculture, say to sow from 15 to 35 lb. to the acre; again, a local authority says about 56 lb. of seed to the acre should be sown. The seed should be

lightly rolled to a depth of between half an inch to one inch. The seed should be sown as early in Spring as land is prepared, before the surface dries. Before the seed is finally selected for planting it should be thoroughly cleaned, and all foreign seeds, or immature seeds, should be graded out, using only the plump seed.

DISINFECTING.

In order to insure against infecting the soil with disease organisms, which later might injure or destroy the growing plants, the seed intended for planting should be given formaldehyde treatment. This treatment consists of spreading the seed on a tight floor and spraying it with a solution made in the proportion of one pint of 40 per cent. formaldehyde to 40 gallons of water. The best results can be accomplished by using a spraying outfit which throws a fine misty spray. Then, by turning the seed with some such implement as a hoe or rake, the entire surface of the seeds should be covered with the solution. About two quarts of the spray material will be sufficient for each bushel of flax seed. While drying, the seed should be turned occasionally with a scoop shovel to prevent them from adhering to each other.

HARVESTING.

Cut with reaper and binder close to the ground, stack to dry, then stack some time before thrashing. The time to harvest is when the top seed bolls turn brown and about half-way up of the straw has turned yellow.

Without any available data to go upon, it is impossible to say what crop of seed is likely to be produced in Australia, but it should be certainly on the same ratio as wheat—namely, from 10 to 20 bushels to the acre (56 lb. to the bushel).

As regards the price likely to be secured for the crop, this is at present impossible to forecast. In the near future the rate will be a high one, and probably in the neighbourhood of 6s. to 10s. per bushel. Conditions prevalent preclude any definite information in this connection. Freights are fluctuating almost daily.

Mr. George Suttor (one of the noted wheat experts of the State) says:—"Linseed is a crop likely to prove very suitable as a rotation crop in the majority of our wheat districts. Its cultivation is almost identical with that of wheat." Mr. Suttor added that this crop matures more quickly than wheat, and one great advantage is that it can be left in the paddock unharvested several weeks without risk of loss from shedding.

[In connection with the above, Messrs. Meggitt, who are largely engaged in the production of linseed oil in New South Wales, state that they are in a position to guarantee a market for at least 10,000 tons per annum, and, as their output is daily increasing, these figures would, in all probability, be considerably augmented before very long. We have frequently advised the growing of the flax plant both for fibre and seed, as a crop likely to give good returns, and the exigencies of the war would doubtless cause a rise in the price of linseed oil and flax, and consequently the farmer would benefit by such an increase in price.—Ed. "Q.A.J."]

SORGHUMS FOR SALE.

In continuation of the series of illustrations of the sorghum, seed of which is obtainable from the Department of Agriculture and Stock (*vide* advertisement in this issue of the journal), we now depict the following varieties:—Dwarf Milo, Shantung Dwarf Milo, Valley Kaoliang.

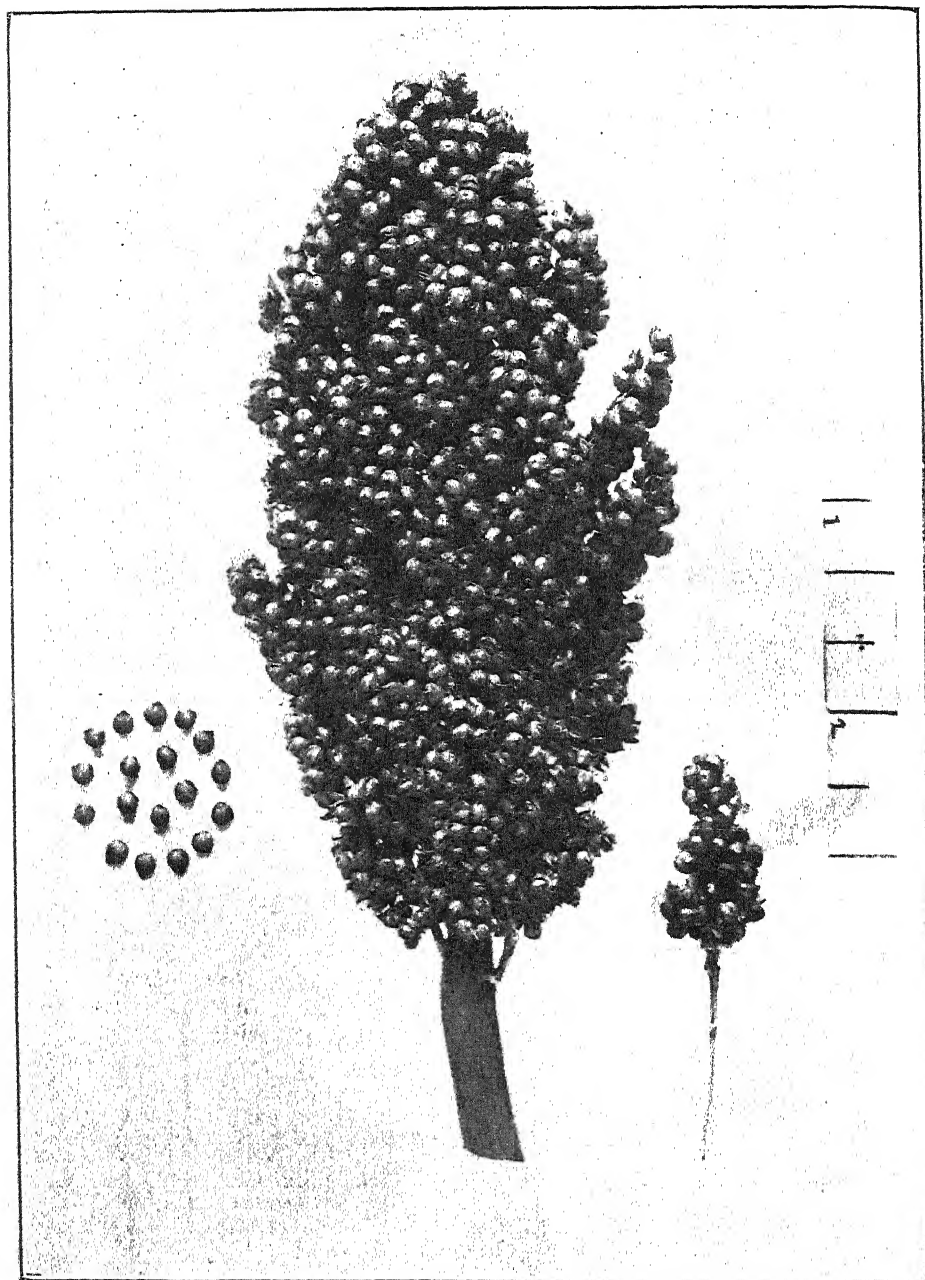


PLATE 9.—DWARF MILO.

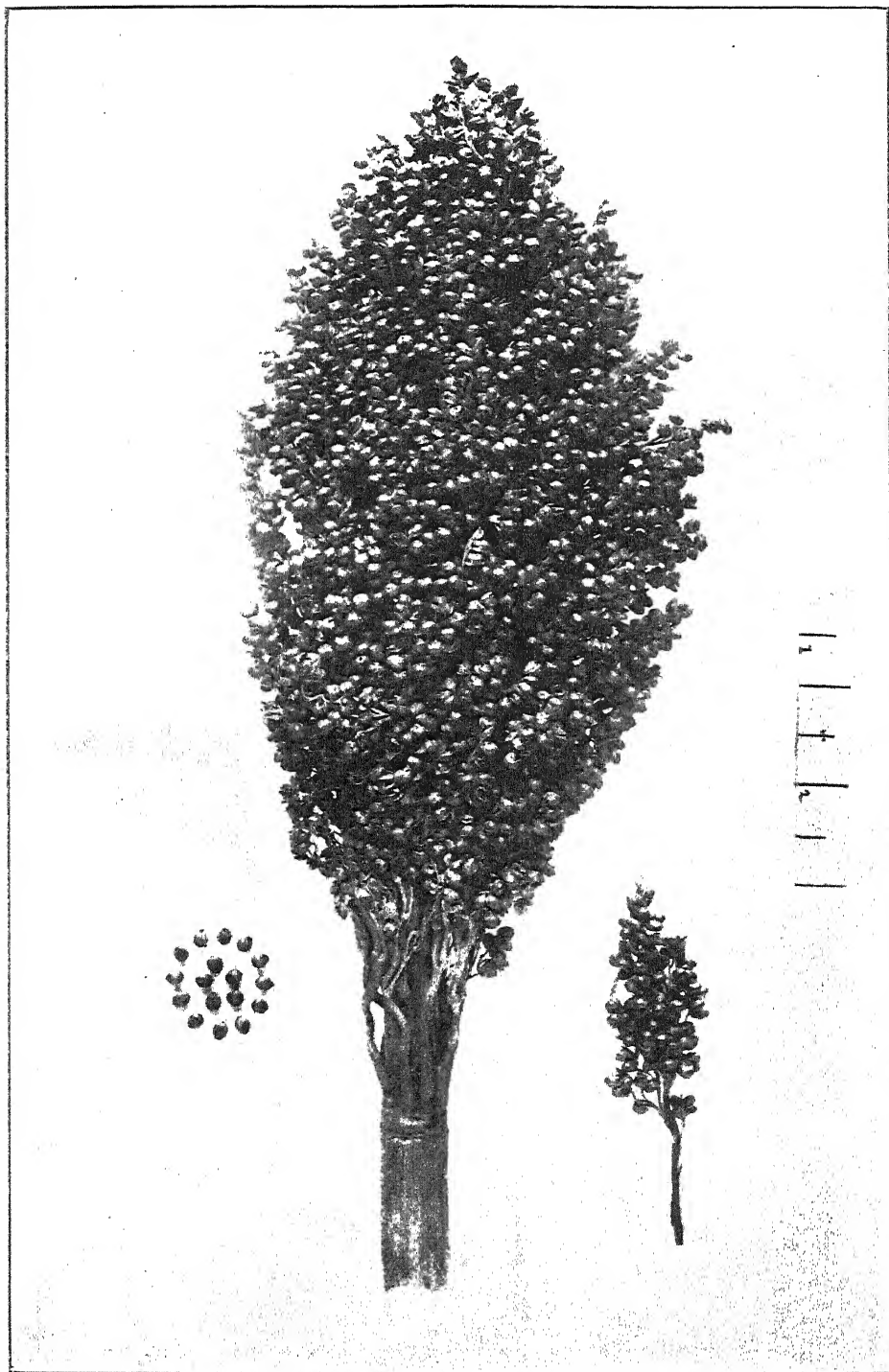


PLATE 10.—SHANTUNG DWARF KAOLIANG.

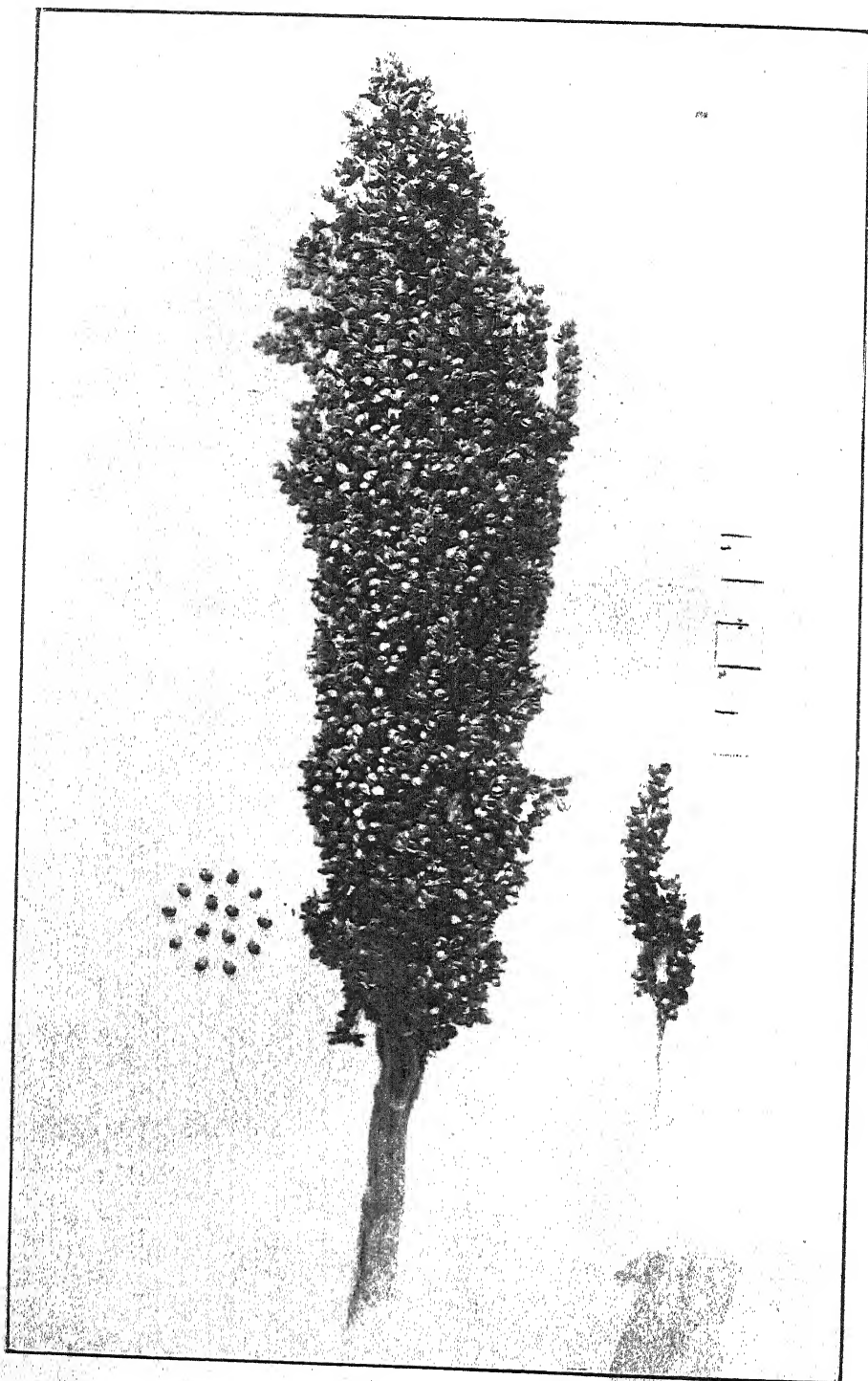


PLATE II.—VALLEY KAOLIANG.

BROOM MILLET.

"In June last" (says "Town and Country"), "Northern River and inland broom millet fetched up to £100 a ton, which was easily a record for Sussex Street. The shortage was mainly due to floods washing away many of the first and second sowings along the Richmond and sister rivers. The Federal Price Fixing Commissioner was to hold an inquiry during the month, with a view to fixing a maximum rate for this staple line."

Such a price is, no doubt, the maximum for the best fibre. It would certainly prove a most profitable crop for Queensland farmers, and they would do well to take advantage of the opportunity offered by the Department of Agriculture and Stock to enable them to obtain seed of the very best varieties of broom millet. As notified in our advertising pages, seeds of sorghum and millet may be obtained on application to the Under Secretary for Agriculture. Postage packets, orders of not less than 3 lb. of any one variety, will be supplied. Three sizes are made up, viz.:—3 lb. for 2s. 6d.; 7 lb. for 5s. 6d.; and 10 lb. for 7s. 6d. respectively (including weight of seed envelope).

THE GROWING OF LUCERNE.

In the course of a most interesting address delivered before the Conference of Mid-Northern Branches of the Agricultural Bureau by the Director of Agriculture, Professor Arthur J. Perkins, South Australia, the following advice was given to farmers:—

GENERAL ADAPTABILITY OF LUCERNE TO SOILS.

We often hear certain types of country referred to specially as "lucerne land"; particularly is this the case in some parts of the Lower North. I am afraid that assertions of this kind have, in the past, been very largely responsible for checking the spread of lucerne as a general farm crop. As a matter of fact, there are very few soils indeed on which lucerne is not likely to thrive; although one must admit that the total yields of this crop are more satisfactory in some soils than in others.

On the whole, so far as lucerne is concerned, the subsoil is probably of greater importance than the soil. Lucerne is an exceedingly deep-rooted plant; its roots have at times been traced to depths of 16 feet to 18 feet below the surface. We may take it, therefore, that, once established, lucerne lives chiefly in the subsoil; hence a favourable subsoil is of greater importance than a favourable soil. The best type of subsoil is a good natural drainage. A stiff subsoil, exposed to lying wet over a long period of time, is always to be avoided; and the same may be said of a rocky unfissured subsoil. In other words, therefore, lucerne requires a type of subsoil into which its long roots are able to penetrate without difficulty.

We cannot, however, altogether overlook the quality and character of the surface soil, since consistently heavy yields are obtainable only when comparatively fertile surface soil of good depth covers a favourable subsoil. In this connection, rich alluvial lands are undoubtedly the best, and should always be selected when available. I must again insist that for the healthy development of lucerne, the presence of a sufficiency of lime in soil and subsoil is an essential factor.

An underground watertable, relatively close to the surface, is often pointed to as a desirable factor in lucerne land. Whilst the value of this feature may be admitted in a general way, it is as well to point out that in certain circumstances it may not be without disadvantage. If, for instance, in these circumstances the height of the watertable is liable to vary with the season, and particularly to rise unduly in the winter months, it may prove more or less fatal to the lucerne plants. It cannot therefore be insisted upon too strongly that whatever the character of the soil, it is absolutely essential to the success of lucerne that the soil offer good natural drainage facilities, and that the plants be not exposed for any length of time to stagnant moisture.

Finally, it is not advisable to place lucerne on land in which salt is likely to accumulate to any extent under the influence of irrigation operations.

PREPARATION OF THE LAND.

When we set about preparing land for lucerne, we should always bear in mind that we are about to sow a crop which, we hope, will occupy the land for several

successive years; hence common sense indicates that we should give to this preparation of the land at least as much attention and care as would be bestowed upon a crop which is sown and reaped and finally disposed of in a single season.

The fact that lucerne is a very deep-rooted plant suggests that in preparing the land we should do everything towards facilitating the early descent of the roots into the subsoil; hence, for best possible results, land which is to carry lucerne should, from the outset, be subsoiled to a depth of 12 inches to 15 inches at least. The simplest plan for the purpose is, perhaps, to break up the land with an ordinary plough to a depth of, say, 6 inches to 8 inches, and immediately afterwards follow this work up with a subsoiler, which will stir up the subsoil to the requisite depth without, however, bringing it to the surface.

We must assume this subsoiling to take place at the time of the year best suited for work of this kind, probably in May or June in most districts. Subsequently to this first treatment, land which is to carry lucerne must be treated in exactly the same fashion as we should treat bare fallow intended for wheat in the following season. If this practice is carefully followed, the subsoil and the land generally, which have been roughly torn up and opened out to a considerable depth, will, under the influence of winter rains and of successive tillage operations, gradually run together again, and mellow down into a suitable type of seedbed, the surface of which should be as fine as an onion bed, and the layers immediately below firm and compact, like those of a well-prepared wheat field. Moreover, frequent tillage operations should have the effect of cleaning the land and freeing it from undesirable weeds.

I know that, relatively to what is done for wheat, there is a tendency to slur over the preparation of the land for forage crops: it is well, therefore, that we should convince ourselves that both yields and durability of the lucerne fields depend very largely on the care and attention we are able to bestow on this initial preparation on the land.

THE APPLICATION OF A DRESSING OF FARMYARD MANURE PRIOR TO SEEDING.

It has already been stated that lucerne thrives best in naturally fertile land; hence everything that we can do towards artificially raising the fertility of average land will contribute much towards a general improvement in future yields.

It is often stated that farmyard manure is essentially a nitrogenous manure, and that since the leguminous crops, of which lucerne is one, do not draw their nitrogen from the soil but from the atmosphere, they can benefit but little from a dressing of farmyard manure. Nevertheless, general experience does not support this view; indeed, quite the contrary would appear to be the case. We may account for the responsiveness of lucerne and other leguminous crops to dressings of farmyard manure to the fact that although they do not draw much nitrogen from the soil, for strong, successful growth they are always dependent on an abundance of organic matter, and for soils inadequately provided with the latter it is always to farmyard manure that the farmer naturally turns. Hence farmers who, as a rule, have no particular use for farmyard manure in their wheatfields should distribute it liberally over land which they intend bringing under lucerne. Any dressing up to 20 tons to the acre, or over, will not be excessive. This manure should be spread over the ground and ploughed under when the land is first broken up in the way of preparation for lucerne; it will thus have a full year to decompose in the soil before seeding operations come round. During this time, too, weeds, the seeds of which it brings with it, will germinate, and can be destroyed by ordinary tillage operations.

GRADING OF THE LAND FOR IRRIGATION PURPOSES.

It should be stated here that it is exceedingly unwise to endeavour to grow irrigated lucerne on land that has not been carefully graded. If grading is neglected, the usual result is that in a very short space of time portion of the land is liable to die out from excess of water, whilst the balance makes poor, weakly growth, because the irrigation waters fail to reach it. If irrigation by flooding is contemplated, the land must be graded to a fairly even level prior to seeding. If, on the other hand, sprinklers are to be availed of, a fall of 3 inches in the chain will always be found advantageous from the point of view of drainage.

IRRIGATION OF SOIL INTENDED TO CARRY LUCERNE.

It is to-day a matter of common knowledge that lucerne, like other leguminous crops, is able, through the medium of special bacteria living on its roots, to abstract free nitrogen from the atmosphere. Moreover, it has frequently been stated that on land on which lucerne has not been grown previously these essential bacteria are at times absent, and that when this is the case, lucerne never makes satisfactory growth. So far as my experience goes, this is very rarely the case in South Australia; and we are almost justified in the view that with us, at all events, these special bacteria are

more or less ubiquitous. It would appear, however, to be comparatively easy to overcome the difficulty in those cases in which direct experience had shown that these bacteria were absent. All that it would be necessary to do would be to secure suitable quantities of soil from a well-established lucerne field in a neighbouring district. This soil, which should not be allowed to dry out unduly, should then be drilled over the land immediately prior to seeding at the rate of 2 cwt. to 3 cwt. to the acre. Hitherto, however, there appears to have been no need for the adoption of this practice in South Australia.

SOWING PERIODS FOR LUCERNE.

When should lucerne be sown? In reply to this question, we find advocates for two seasons, some preferring the spring and others, again, the autumn. Now, whilst I readily recognise that in very cold countries—countries, in fact, in which lucerne is not as a rule currently grown—spring sowing has distinct advantages, from the point of view of personal experience, I am convinced that autumn sowing is in every way better adapted to general South Australian conditions. So far as I am able to judge, the only advantage that can be claimed for spring sowing is that the young seedling plants are less exposed to damage by frost than when sown in autumn. Such an advantage unquestionably holds good in those countries in which winter frosts are of exceptional severity. Under our conditions, however, it has, in my opinion, little or no significance; hence, in dealing with seeding operations, I shall assume that we have in view autumn seeding alone. Moreover, should severe frost happen occasionally to destroy autumn-sown lucerne, it always remains open to us to sow again the whole field, or such portions of it as have been damaged, as soon as spring opens.

I think it worth while to draw attention to one of the chief advantages that can be claimed for autumn sowing of lucerne. Autumn-sown plants have ample time to penetrate into the depths of the soil before the hot weather sets in; hence, in the summer that immediately follows seeding operations, autumn-sown plants are infinitely stronger and healthier than those sown in spring, and one of the immediate consequences of this fact is that whilst the cuts of the first year from a spring-sown crop are relatively light, the total cuts from an autumn-sown crop of the first year frequently almost equal in weight the cuts of the second year. This, it will be agreed is, from the pecuniary point of view, a very appreciable advantage in favour of autumn sowing.

Attention should, perhaps, be drawn to an objection that is frequently raised to autumn sowing. It is said—and with reason—that an autumn-sown crop is very often more or less smothered by winter-growing weeds. I shall point out, in the first place, that this difficulty would be very much minimised if, as I have suggested, the land which is to be sown to lucerne had been carefully bare fallowed in the previous season. Nevertheless, I agree that, in spite of careful fallowing, we cannot altogether avoid the development of a certain amount of winter weed growth. I must state, however, that in my personal experience, these winter weeds are comparatively innocuous from the lucerne's point of view; indeed, at times the stronger weeds may even act as shelter against frost to the more slow-growing lucerne plants. Let us admit that by August there will often seem to be more weeds than lucerne plants. It is wise, at this stage, to take an early cut of lucerne and weeds, providing always the land is sufficiently dry on the surface to admit of it. Subsequently, under the influence of rising temperatures, the second growth will make rapid progress, and the second cut, still more or less seedy, should follow as soon as possible; in September, if circumstances admit of it. Thereafter, throughout the summer months, I can guarantee that not a weed will be found in a well-sown field of lucerne; and this could hardly be said of spring-sown lucerne, which in the first year is generally apt to be overrun with strong-growing summer weeds, such as hogweed, &c.

THE USES OF A COVERING CROP FOR LUCERNE.

The sowing of a sheltering or covering crop simultaneously with lucerne is frequently recommended. The chief object aimed at would appear to be to occupy the land more profitably in the first season than could be done with lucerne alone. With this object in view, rye-grass, rye, and even barley or oats are sometimes sown with lucerne seed. It cannot be said that this practice is of any particular advantage to the lucerne plants themselves; indeed, I am of the opinion that it detracts from the eventual returns of the yield by hindering early growth. When lucerne is autumn-sown, I can see absolutely no advantage in adopting this practice; hence in no circumstances can I recommend it.

WHEN TO PRACTICE AUTUMN SOWING.

Assuming that the practice of autumn sowing is recognised as best suited to local conditions, it remains for us to determine what particular time in the autumn months is best adapted to the sowing of lucerne.

In principle it is of advantage that the young plants should be above ground as early in autumn as circumstances permit of. In the early autumn the ground is still

warm, and given a sufficiency of moisture, the young plants will take very ready advantage of it; hence, if we have irrigation facilities at our disposal, I recommend sowing towards the end of March. If, on the other hand, we have to trust to rain to bring up the seed, we should generally sow on the first break in the season. Should autumn rains hold off unduly, I would not hesitate to sow dry and trust to the first rain to bring up the seed.

DRESSING OF SUPERPHOSPHATE PRIOR TO SEEDING.

Notwithstanding an earlier dressing of farmyard manure, it is always advisable, in our type of soils, to drill in from 2 cwt. to 4 cwt. of superphosphate to the acre immediately prior to seeding.

[TO BE CONTINUED.]

AGRICULTURAL RESEARCH IN AUSTRALIA.

We are in receipt of Bulletin No. 7, entitled "Agricultural Research in Australia," issued by the Commonwealth Advisory Council of Science and Industry. In it are published the various papers read at a conference of agricultural scientists from all the States of the Commonwealth, which was held in Melbourne in November, 1917. In addition, the Bulletin publishes interesting summaries of the discussions on the various papers read, and the resolutions which were proposed at the earlier sessions of the conference which were then carried provisionally, and were finally adopted at the last session. The papers read covered a wide scope of research, including the breeding of cereals, immunity, inheritance, and acclimatisation of plants, the tobacco and fibre-growing industries in Australia, the utilisation of the phosphate deposits of Australia, the Australian sugar industry, and suggestions as to the Commonwealth endowment of agricultural research. As regards fibre-growing, a most interesting paper was read by Mr. T. Hogg, a few extracts from which will be found in another part of this journal, as being of especial interest to farmers and manufacturers in this State.

An attempt was made to initiate the cultivation of New Zealand hemp; but, although the plant does well here, no success attended the efforts made to establish plantations of this valuable fibre plant. Flax has also been tried, and, as a winter crop, thrives well, but when it came to the labour question, Queensland farmers could not compete with Russia. Mr. Hogg very rightly urges Australian agriculturists to grow flax, pointing out that Australia might some day be so isolated that she could not import anything. Still, the labour question stands in the way of any fibre industry being profitably carried on here. It may be noted that with the exception of a kind of tall-growing flax in Italy, flax grown in Russia, and New Zealand flax, all our supplies of useful fibres are imported from countries where cheap black labour is employed. Hence all attempts to grow fibre plants to a profit with white labour meet with disaster.

THE POSSIBILITY OF CULTIVATING FIBRE PLANTS IN AUSTRALIA.

In the course of Mr. Hogg's remarks on the above subject, in the paper read by him at the fifth session of the Advisory Council of Science and Industry held in Melbourne on the 15th November, 1917, the question of the cultivation of fibre plants in Australia was dealt with from a business point of view by a business man. This is precisely the information which should be of much interest to capitalists and to all engaged in agricultural pursuits in Queensland. We have persistently advocated the cultivation of sisal hemp, Mauritius hemp, *Sansiviera* (Murva), and flax in Queensland, all of which thrive well. A few years ago the sisal agave was very profitably grown both in the South, North, and in the Burnett district at Childers, but owing to the constantly increasing wages of farm labourers, and the cost of machinery, the industry gradually died out. Mauritius hemp, the product of *Eurcra gigantea*, was never cultivated here, although it thrives well even in frosty districts, the leaves attaining a length of from 7 to 8 ft. In former times, when sisal hemp was worth £24 per ton in Australia, some planters made a clear profit of £12 per ton. Yet the industry died out, and there seems no probability of its revival. Sisal fibre is worth £100 per ton since the war, but even if there were any supplies available in Queensland, no advantage could be taken of the great rise in price, owing to want of transport facilities. The only market would be limited to the requirements of Australian ropemakers, which are too restricted in their operations to warrant the erection of expensive machinery. A considerable quantity of the fibre is produced in Papua, especially on one large well-equipped plantation at Tavai. But in Papua there is a plentiful supply of black labour, and the natives soon become experts at working the machinery.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FROM 30TH MAY TO 29TH JUNE, 1918.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Melba ...	Holstein ...	31 Mar., 1918	1,208	4.1	58.04	
Buttercup ...	Shorthorn ..	30 May ..	1,058	4.6	57.34	
Royal Mistress ...	Ayrshire ...	13 Mar. ..	658	5.9	45.95	
Dawn of Warragaburra	Jersey ...	4 May ..	658	5.2	40.41	
Miss Betty ...	" ...	9 June ..	632	5.3	39.52	
Constancy ..	Ayrshire ...	7 April ..	667	5.0	37.65	
Charming Damsel	" ...	1 May ..	735	4.1	33.70	
Lady Margaret ...	" ...	27 Dec., 1917	493	5.4	30.87	
Lady Peggy ...	" ...	30 Mar., 1918	710	3.9	30.50	
Yarraview Ida's Hope	Guernsey ...	5 May ..	577	4.0	25.78	
Iron Plate ...	Jersey ...	14 Oct., 1917	311	6.9	25.46	
Jeannie ..	Ayrshire ...	13 Dec. ..	339	6.2	24.89	
Leda's Jessie	Jersey ...	25 Mar., 1918	390	5.3	24.42	
Mistress Bee ...	" ...	23 Jan. ..	420	4.9	24.27	
Leading Lady ...	" ...	26 Dec., 1917	333	5.9	23.35	
Hedge's Nattie	Holstein ...	1 Feb., 1918	519	4.0	23.20	
Lady Loch II. ...	Ayrshire ...	13 June ..	382	4.9	22.07	
Charity ...	Jersey ...	24 April ..	376	5.0	21.22	
College Ma Petite	" ...	10 Nov., 1917	291	6.1	21.02	
Princess Kate ...	Ayrshire ...	5 May, 1918	449	3.9	20.54	
Glow VI. ...	Guernsey ...	9 Nov., 1917	375	4.8	20.28	

TREATMENT FOR DOGS, FOALS, AND CALVES AFFECTED WITH SCRUB TICK.

Scrub ticks cause a great deal of trouble to stockowners in certain districts with a large percentage of mortalities. It has been stated that these ticks do not harm the animals during the first four days of attachment, so it is recommended that, where scrub ticks are prevalent, valuable animals should be thoroughly examined every second or third day. It has been proved that trypan blue, injected under the skin, is a specific for this disease in the dog. The paralysis soon improves, and in a few days the animal thoroughly recovers. One dose of the trypan blue is usually sufficient. A 2½ per cent. solution (about 9 grains to a fluid ounce of water) is made by dissolving the blue in boiling water. A sediment falls as the solution cools, and this should be removed by filtering through a funnel, in which a properly folded filter is placed, or a piece of clean linen which has been previously boiled. The hypodermic syringe and needle, before being used, should be placed in a dish containing cold water, then placed over the fire, and the water boiled for about ten minutes. This thoroughly sterilises the syringe and needle, which are now ready to use when the solution to be injected has cooled. The injection can be made anywhere under the skin, but the best positions are either in front of the chest or behind the shoulder. The skin in these positions being loose, and a fold can easily be caught up by the finger of the left hand, whilst the needle is inserted with the right hand. It is advisable to clip off the hair and disinfect the spot chosen before introducing the needle. A dose for dogs, according to age and size, varies from 1 to 5 drachms, or 1 to 5 teaspoonsful; the dose for calves and foals, according to age and size, from ½ oz. to 2½ oz., or 1 to 5 tablespoonsful.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Books is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
 The Shorthorn Herd Book of Queensland;
 The Jersey Herd Book of Queensland;
 The Illawarra Herd Book of Queensland;
 The Ayrshire Herd Book of Queensland;
 The Milking Shorthorn Herd Book of Queensland;
 The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS.				
AYRSHIRES.				
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	10	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview," Southbrook	7	34	Do.
JERSEYS.				
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoorra	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, <i>via</i> Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS— <i>continued.</i>				
GUERNSEYS.				
Queensland Agricultural College	Gatton	2	2	Eligible, but no Guernsey Herd Book of Australia
HOLSTEINS.				
Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman	.. "St. Athan," Wyreema	12	47	Do.
F. G. C. Gratton	.. "Fowlerton," Kingsthorpe	1	15	Do.
R. S. Alexander	.. Glenlondond Farm, Coolumboola	1	3	Do.
Ditto	.. Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings	.. St. Gwithian, Toogoolowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff	.. Inavale Stud Farm, Bunjurgun, Q.	3	9	Do.
E. Swayne	.. West Plane Creek, Mackay	1	2	Do.
ILLAWARRA.				
A. Pickels	.. Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	Corndale, Coolabunia	3	43	Do.
W. T. Savage	.. Ramsay	2	22	Do.
Hunt Bros.	.. Springdale, Maleny..	3	62	Do.
MILKING SHORTHORNS.				
P. Young	.. Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	.. Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	.. Torran's Vale, Lane-field	1	9	Do.
W. Middleton	.. Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten	.. "Dunure," Miles ..	2	8	Do.
BEEF BREEDS.				
SHORTHORNS.				
T. B. Murray-Prior	.. Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall	.. Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan	.. "Arubial," Condamine	3	6	Do.
W. B. Slade	.. E. Glengallan, Warwick	2	20	Do.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.	
BEEF BREEDS— <i>continued.</i>					
HEREFORD.					
A. J. McConnell	.. Dugandan, Boonah	19	36	Australian Herd Book	Hereford
E. M. Lumley Hill	.. Bellevue House, Bellevue	45	127	Do.	
Tindal and Son	.. Gunyan, Inglewood	50	400	Do.	
SUSSEX.					
James T. Turner	.. The Holmwood, Neerum	2	4	Sussex Herd Book of England	

RE IRON ORES, AND BACTERIA IN STOCK.

By L. G. JONES.

On the authority of Mr. Emile Gautier there are fourteen substances that nourish all plant and animal life without destruction. Ten of these substances have exactly the composition of an iron ore. (See February issue of this Journal.) The other four are drawn from the air, and are carbon, oxygen, hydrogen, and nitrogen. The differences of form are the result of a variety of combinations of these primary substances that may be compared to the combinations of the twenty-six letters of the alphabet forming a variety of words. It is these elementary substances that worms, parasites, and depredatory bacteria draw from the animal's food or blood that which causes the animal to become anemic. Extract from the "Live Stock Journal": "The fourth constituent of food consists of the mineral salts, which include phosphoric acid, soda, potash, and lime. Although these foods are minute in quantity, they are just as essential to the health of the animal as either of those already named (starch, &c.). Let us take a simple example. As bones are chiefly constructed of phosphate of lime, it follows that if the milk supplied to a calf were deprived of these mineral salts before it was consumed no bones would be built, and the calf would not only fail to grow but fail to live." It is in this manner that worms, ticks, fluke, and other parasites in stock act by removing from the food and blood the mineral salts, such as phosphoric acid, iron, soda, potash, lime, &c. The ticks emit a secretion that undoes the chemistry of the blood and enables them to extract the mineral properties therefrom, that which they require and thrive upon, and when this goes on to a sufficient extent, the animal becomes anemic and dies, or becomes a suitable developing medium for depredatory bacteria which find a lodgment in the emaciated body. It is not necessary to administer powerful medicines to kill parasites or microbes. It is quite evident that there are useful as well as depredatory and vicious bacteria, and there is reasonable evidence that the useful kinds are as valuable in the economy of Nature as the baser variety are destructive to animal life. It is more than probable that the kindly bacteria wage a war of extermination against those of the baser sort, and under the favourable conditions of the iron ore and mispickel treatment would overcome and destroy them. It is self-evident that the true and rational way to get rid of objectionable bacteria is not to take strong and poisonous medicines to kill them, and thereby kill your bacterial friends as well as your parasitical and bacterial enemies, but to use such remedies as will restore the blood, fortify the nervous system, and thereby starve out the baser bacteria that depend for their existence upon blood impurity and want of nervous vitality. There is no excuse for giving strong medicines to kill parasites or anything of a bacterial nature, for the restoration of the health and purity of the intestinal secretions will starve them out. It is not necessary to resort to heroic measures except in very exceptional cases. Most bacteriologists of note hold that bacteria of the useful variety are employed to assist digestion, and, seeing that good digestion depends in a measure upon the operations of these microscopic creatures, it is manifestly bad practice to administer medicines of sufficient strength to kill microbes. The days for heroic treatment have gone by.

The Horse.

IN-BREEDING—THE CASE OF THE CLYDESDALE.

Writing in the "Scottish Farmer" on the above question, replying to the unanswered question of a correspondent—what will the in-and-in breeding of Clydesdales, which is getting common, lead to?—Mr. James A. Reid, of Airdrie, the Scottish lawyer, whose name is a household word in collie circles, says:—

"Is there any reason for silence? The more or less certain results of such breeding in our other domestic animals are to be found in their histories and the extensive literature of the subject generally; but, so far as I know, no authoritative article of any kind has ever appeared in Clydesdale literature. The following paragraph, however, appeared in 'The Scottish Farmer' of 2nd September, 1916:—In-breeding is very apparent in the modern Clydesdale. A breeder of some eminence, in a private letter to the writer, bewails its prevalence and its full effects. He maintains that it has something to do with the high death-rate among foals and the increasing difficulty of rearing the foals which survive. That there is a deal of sameness in the composition of the breeding of many fashionable horses and mares is undoubted; yet it is questionable whether there is much in-breeding in the sense of breeding which in the human family would be denounced as incestuous. In-breeding as practised by the early Shorthorn improvers was of this nature. It was by resorting to it that Mr. Christopher Wilson achieved phenomenal results in pony breeding, but not much of the kind of mating which proved so successful in these cases is to be found in the modern Clydesdale. More harm has been done by breeding from unsound horses. Those having knowledge of important back crosses in the pedigree of some very notable animals have legitimate fears as to the future of their descendants. Nevertheless, there is point in the criticism of the correspondent referred to. It was a dictum of the late Lawrence Drew that in-breeding ought always to be avoided with the draught horse.

"No problem of animal breeding has given rise to more controversy than that of in-and-in breeding—i.e., in-breeding in the most intensive sense of the term. From the days of Bakewell onwards there has been a wide difference of opinion as to the place which should be assigned to it in the experience of the ordinary breeder. Some have regarded it as altogether helpful, and others as altogether harmful. Because of this extreme difference in view the question has been much discussed in the agricultural Press, and frequently to but little purpose. Can anyone with a competent knowledge of the problem generally deal with it closely in its application to Clydesdale breeding? Can he tell us whether close-breeding in the fullest sense of the term is or is not 'very common,' and, if so, whether it can be said with any certainty that the practice has led and is leading to retrogression in the breed, as is commonly alleged? The sooner the question is faced the better in the interests of the breed and of breeders, who never had more reason to be alive to the future than they have now. When the facts are satisfactorily ascertained we shall see what conclusions (if any) can reasonably be drawn from them, having regard to other factors in the problem."

In an article on the above subject, the "New Zealand Farmer" for June, 1918, says:—

"What conflicting views are expressed on this great principle! On the one hand, we have the striking fact that the greatest breeders the world has seen owed their success to the principle, and, on the other hand, we have so-called authorities declaring that it leads to deterioration of type, sterility, and is the greatest danger besetting the work of live stock advancement. The main fact to remember is that the men who made such good use of in-breeding knew what they were doing. They realised that they were working with a two-edged weapon, and while it was powerful for good it was potent for evil. Rightly used, it was the most important of all factors in advancing type, and used indiscriminately it would be just as effective in bringing about deterioration. The right use of the principle implies but two things—undoubted constitution in the material being used, and realising that there is a danger limit. The degree of prepotency of the sire largely governs the extent to which in-breeding can be carried. But breeders nowadays have not the same reason to adopt close in-breeding as did the founders of our modern breeds who were engaged in the creative work of establishing types. Line breeding is the principle that suits the purpose of our day, and given constitutional vigour—the sire must be

masculine even to coarseness—we may safely practise a system which will enable us to attain our ideal with some degree of certainty, instead of bringing in frequent out-crosses—as is the common practice—and thereby multiplying again and again the tendencies to variation and consequent departure from the type being aimed at.

EXPERIMENTAL IN-BREEDING.

“The effect of close in-breeding on deterioration of type and sterility has been tested by an American scientist, in some cases with quite remarkable results. This investigator, Dr. King, in an address before the Pediatric Society in Philadelphia, in 1915, and summarised in the ‘Journal of Heredity,’ described the results obtained over a long series of experiments with rats. The exhaustive trials made indicated that close in-breeding does not necessarily lead to a loss of size or of constitutional vigour or of fertility if the animals so mated come from sound stock in the beginning, and sufficient care is taken to breed only from the best individuals. The rats, it should be remarked, were closely in-bred for twenty-two generations. The ‘Journal’ remarks that the experiment cannot in the nature of things settle the problem of whether in-breeding is *of itself* injurious. The experiments prove conclusively, however, that if any injuries result they are not so great but that they can be counteracted by careful selection of the animals used. Of course, what applies to rats may not apply to other breeds of stock. The ‘Journal’ makes this final observation: ‘The results of Dr. King’s experiment in breeding rats, and the whole teaching of genetics, however, can be safely followed by the practical breeder to this extent—that he can use a moderate degree of in-breeding through a number of generations without fear of evil results, *provided he is mating the best with the best* in each generation; and that the results in most cases will be a considerable improvement in his stock. The superstitious fear of in-breeding in any form which long hung over practical breeders is rapidly disappearing: for the geneticist it long ago ceased to exist.’”

ART OF KILLING PIGS.

Mr. E. L. Wood, a pig-breeder, well known in America, writes:—

“For killing pigs I use a small-bore rifle, and shoot them in the centre of the forehead. This avoids excitement, and the hogs are not exhausted. Then I turn the animal quickly on its back and stick it directly in front of the breast bone, being careful not to injure the shoulder; but instead of scalding in the usual manner I have tried a new wrinkle. Most men dislike the work of scalding a pig because of the steam and smell, and the new plan does away with this entirely. The method as reported to me was to take the dead pig to an open place free from litter or straw, and where there is nothing to catch on fire. Then pour a small quantity of gasoline over the carcass and touch a lighted match to it. The plan sounded so good that I gave it a trial on two large pigs. No directions were given as to the best way of applying the gasoline or the quantity to use. I had been simply told that a farmer in another neighbourhood used the method, and it was very successful. So I put my pigs in a safe place and used the gasoline very sparingly. Less than a pint covered the whole carcass except the part touching the ground.

“We later gave the head and parts of the feet a little more gasoline after the first application, and then turned the pig over and completed the small portion left. At the touch of the lighted match the carcass burst into flames, and burned for perhaps two minutes. At the end of that time the hair was all gone. We then scraped with knives and scrapers, as with the scalding method, and were agreeably surprised with the outcome. The hair stumps and the outer skin which always comes off in a proper scald came likewise after singeing, leaving a nice white carcass. We then hoisted the pig and rubbed it down with a scrubbing brush, using a pail and a-half of warm water. No smell or taint of gasoline or burning hair, or anything of the sort was left, and the cleaning was done in half the usual time.

“With the second pig we made even better time. In using this method the chief precaution is to have the pig in a clear open place, away from buildings, and to bring no more gasoline near the carcass than the amount actually needed. Do not fire the carcass until it is entirely wet with the gasoline.

“The feet, neck, and belly are the parts most difficult to clean. With my next pig I shall hang up the carcass, pour the gasoline on top and let it run down. After the body is cleansed and the entrails removed, I split the carcass, which permits it to cool more thoroughly. I let the carcass become thoroughly cold, so that the meat can be trimmed neatly.”

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JUNE, 1918.

The weather has been very trying during the month. Westerly winds, cold nights, and frosts have been prevalent. Such weather as has been experienced picks out the birds that have had their constitution undermined in any way. There have been several cases of broodiness, one being among the Leghorns. Two deaths have occurred and the birds replaced. The birds generally look very well, and good laying can be expected as soon as the weather improves. Odd pens are feeding indifferently, and this, combined with the cold weather, will not assist their progress. Following are the individual records:—

Competitors.	Breed.	June.	Total.
LIGHT BREEDS.			
*Dixie Egg Plant	White Leghorns ...	143	436
*G. W. Hindes	Do. ...	134	360
*E. Chester	Do. ...	125	356
*C. Knoblauch	Do. ...	126	349
*C. P. Buchanan	Do. ...	124	348
*G. Howard	Do. ...	133	345
*G. Prince	Do. ...	113	343
*T. Fanning	Do. ...	116	339
Mrs. L. Henderson	Do. ...	95	331
*W. Becker	Do. ...	124	331
*O.K. Poultry Yards	Do. ...	108	324
*G. H. Turner	Do. ...	128	320
*Oakland Poultry Farm	Do. ...	121	314
B. Caswell	Do. ...	105	314
*W. Lyell	Do. ...	121	312
H. Fraser	Do. ...	88	307
*Dr. E. C. Jennings	Do. ...	94	298
*R. Holmes	Do. ...	134	294
*L. G. Innes	Do. ...	105	291
*Range Poultry Farm	Do. ...	80	281
*E. A. Smith	Do. ...	123	279
O. W. J. Whitman	Do. ...	99	279
J. J. Davies	Do. ...	98	279
G. Williams	Do. ...	95	276
*T. Taylor	Do. ...	96	273
*Chris. Porter	Do. ...	101	260
*J. Zahl	Do. ...	100	258
*Quinn's Post Poultry Farm	Do. ...	94	256
R. T. G. Carey	Do. ...	111	248
*Mrs. A. T. Coomber	Do. ...	95	234
S. Wilkinson	Do. ...	79	221
Mrs. L. F. Anderson	Do. ...	78	211
*Homalayan Poultry Farm	Do. ...	97	209
*T. B. Hawkins	Do. ...	65	204
Geo. Trapp	Do. ...	61	203
Mrs. A. G. Kurth	Do. ...	55	199
*J. M. Manson	Do. ...	74	should be
Progressive Poultry Pens	Do. ...	3	emphasises

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	June.	Total.
LIGHT BREEDS— <i>continued.</i>			
*J. W. Newton	White Leghorns ...	59	193
H. B. Stephens	Do.	80	189
H. F. Britten	Do.	47	186
*Mrs. R. Hunter	Do.	88	177
Shaw and Stevenson	Black Leghorns ...	68	163
P. O. Oldham	White Leghorns ...	55	138
W. A. Wilson	Do.	77	128
A. W. Walker	Do.	53	181
B. Chester	Do.	73	118
HEAVY BREEDS.			
*Nobby Poultry Farm	Black Orpingtons ...	142	385
T. Hindley	Do.	116	315
*W. H. Reilly	Chinese Langshans ...	89	237
*W. Smith	Black Orpingtons ...	95	275
*E. F. Dennis	Do.	121	273
*E. Morris	Do.	126	261
E. M. Larsen	Do.	127	258
*A. E. Walters	Rhode Island Reds ...	63	242
*J. W. Macrae	Black Orpingtons ...	120	242
W. J. Mee	Do.	81	231
*Mars Poultry Farm	Do.	123	225
*R. Burns	Do.	127	204
*D. Fulton	Do.	98	161
H. Puff	Rhode Island Reds ...	74	154
A. Shanks	Black Orpingtons ...	110	152
*F. A. Claussen	Rhode Island Reds ...	94	132
Th. W. Lutze	Black Orpingtons ...	72	115
Jar. Fitzpatrick	Rhode Island Reds ...	47	73
Totals ... ..	...	6,297	16,276

* Indicates that the pen is engaged in the single hen test.

RESULTS OF SINGLE HEN PENS.

Competitor.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
Dixie Egg Plant	70	72	78	65	74	77	430
G. W. Hindes	79	64	60	61	54	42	360
E. Chester	53	66	54	72	58	53	356
C. Knoblauch	55	48	67	54	63	62	349
C. P. Buchanan	59	49	63	52	65	60	348
G. Howard	53	55	65	53	56	63	345
Geo. Prince	30	60	67	64	62	60	343
T. Fanning	61	61	63	31	63	60	339
Mrs. L. Henderson	53	63	58	25	64	68	331
W. Becker	56	54	42	65	50	64	331
O.K. Poultry Yards	59	61	61	47	58	38	324
G. H. Turner	21	43	53	62	71	60	320
Oakland Poultry Farm	51	53	60	59	45	46	314
W. Lyell	59	58	59	53	41	42	312
Dr. F. C. Jennings	45	63	59	51	52	28	293
the best to cool can be	64	53	42	43	41	51	294
... ..	43	69	70	27	25	57	291

RESULTS OF SINGLE HEN PENS—*continued*.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS— <i>continued</i> .							
Range Poultry Farm	30	67	25	48	50	61	281
E. A. Smith	25	64	51	65	54	20	279
Thos. Taylor	27	57	56	35	44	54	273
Chris. Porter	9	49	50	39	56	57	260
J. Zahl	56	44	46	47	42	23	258
Quinn's Post Poultry Farm	62	27	36	34	66	31	256
Mrs. Coomber	18	54	39	43	20	60	234
Homalayan Poultry Farm	53	45	23	17	54	17	229
T. B. Hawkins	50	33	55	8	36	22	204
J. M. Manson	60	52	62	6	11	8	197
J. W. Newton	38	56	1	25	42	31	193
Mrs. R. Hunter	26	49	2	30	28	42	177

HEAVY BREEDS.

Nobby Poultry Farm	72	65	57	56	62	73	385
W. H. Reilly	51	55	61	27	35	58	287
W. Smith	70	42	22	48	39	54	275
E. F. Dennis	67	43	40	5	71	47	273
E. Morris	29	54	63	60	39	16	261
A. E. Walters	37	60	30	42	66	7	242
J. W. Macrae	22	13	63	36	54	54	242
Mars Poultry Farm	33	47	55	38	32	20	225
R. Burns	29	23	18	24	58	47	204
D. Fulton	31	31	11	16	1	75	161
F. A. Claussen	32	31	6	25	37	1	132

EGG-LAYING COMPETITIONS.

No egg-laying competition is worthy of the name unless it progresses in its methods from year to year, and is something more than a mere contest in the number of eggs that can be laid. The first egg-laying competition in Australasia, that of Hawkesbury Agricultural College, promoted, it may be observed, at the instigation of a newspaper, the Sydney "Daily Telegraph," has done great work for the industry, and to-day is probably the leading egg-laying competition in the world. Time was when the Hawkesbury test was declining in its educative influence on the industry. The standard of the birds exhibited was not what it should be. There was more than a suspicion that many of the competing birds were not pure-bred specimens of the breeds they were supposed to represent. A great advance, however, has been made in the standard of the test since it came under the control of Mr. Hadlington, the present New South Wales expert. Realising the necessity of maintaining type and checking that undesirable deterioration, especially in size, that is taking place in connection practically with all the egg-laying competitions, Mr. Hadlington decided upon a very sound policy. He instituted a weight clause in order to eliminate diminutive specimens. Combating the argument that birds *should* be accepted because they have been bred from tested high producers, he wisely emphasises

the fact that no matter what the birds are bred from, if the physique is not there they are not fit subjects for competition simply because they are not fit subjects for the breeding-pen. This being the case, it would be a waste of time to test them, and a delusion both to the breeder and the public. Here we see the great value of a test controlled by a Government Department as against tests conducted by societies and individuals. Had any of the New Zealand tests been under the direction of the Department of Agriculture we believe that the very important regulation adopted in New South Wales would have been in vogue in this country, for we very much doubt if any man in the poultry world of this or any other country has done more to fight for standard quality of utility stock than has Mr. F. Brown, the chief expert of this country. He has preached in season and out of season the policy that no matter what the egg-laying capacity of the bird is it is not fit for the breeding-pen if it has not the desired constitution, size, and breed quality. In some cases he has condemned the great majority of the birds in our leading tests as unfit for breeding purposes. Mr. Hadlington has been able to put into practice, by reason of the big New South Wales test being under State control, what has not been possible in this country owing to private direction of competitions. Though a weight class was instituted at Hawkesbury, Mr. Hadlington remarks that in the light breeds many poor specimens competed, and he declares that if strict culling were practicable at the commencement of the competition the average of the section would have been a great deal higher. There was a considerable improvement, however, both in type and physique in the heavy section. The result of doing something to eliminate the weedy types from the competition has provided a remarkable demonstration. Mr. Hadlington reports that the outstanding feature of the test is that the winning groups and many of the individual high producers are birds showing the best type and physique.

INTERESTING FACTS.

We make no apology for quoting the following paragraphs from Mr. Hadlington's instructive report:—

“As bearing upon this subject, the weights of the two leading groups (first-year hens), when received at the commencement of the competition and at the conclusion of the test, will be of interest:

“C. Judson's Black Orpingtons' weights at the commencement of the competition, with the weights at the close in parentheses, were as follow:—5 lb. 6 oz. (6 lb. 12 oz.), 5 lb. 6 oz. (6 lb. 8 oz.), 6 lb. 4 oz. (8 lb. 10 oz.), 6 lb. (7 lb. 2 oz.), 5 lb. 6 oz. (6 lb. 14 oz.), 5 lb. 9 oz. (6 lb. 6 oz.). The hen that has put up the score of 312 eggs increased in weight during the competition from 6 lb. to 7 lb. 2 oz. Mrs. Chalmers' White Leghorn weights at the commencement and close were:—3 lb. 14 oz. (4 lb. 8 oz.), 3 lb. 14 oz. (4 lb. 10 oz.), 4 lb. 4 oz. (5 lb. 2 oz.), 4 lb. (4 lb. 10 oz.), 4 lb. 2 oz. (4 lb. 12 oz.), 4 lb. 3 oz. (5 lb. 4 oz.). These were all fairly typical, rather deep-bodied hens, perhaps a little on the racy side.

“The ration fed during the test was as follows:—Morning wet mash: Pollard 60 per cent., bran 20, lucerne dust 12, meat or blood meal 8. Evening grain ration: Two-thirds wheat, one-third crushed maize. These give a combined nutritive ratio of 1 to 4.5. With the morning mash 22 oz. of common salt was used, and, to ensure its even distribution through the mash, the salt is dissolved in the water with which the mash is mixed. Green feed was given at midday.

“Although the above ration is laid down to be fed, and has been fed as far as practicable during the test, as also in previous years, it should not be supposed

that feeding the competition birds has been entirely free from the difficulties more or less experienced by poultry farmers in general in regard to pollard, bran, and even wheat of good quality. During the first six months of the competition in particular a shortage of one or the other, as well as poor quality, was frequently experienced owing to the inability of the department to secure adequate supplies.

“It might be well to point out a few facts in connection with the conduct of these competitions. The first is that the hens are fed on simple food as shown above, such as is available to almost every poultry-keeper; no patent food, condiments, or other stimulating articles are used, nor are any methods to that end practised. Secondly, every hen receives exactly the same treatment, and there is no special pampering of individual hens or groups that may show promise of making big records. Thirdly, each hen must lay eggs not less than 2 oz. in weight in order to compete for a prize. It, therefore, follows that every hen making a record at this competition must have conformed to every essential imposed by straight-out utility qualifications.”—“New Zealand Farmer.”

The Orchard.

BANANA CULTIVATION.

Mr. B. Jewitt, Buderim Mountain, writes:—“For many years I have cultivated bananas, and my experience teaches me not to scarify too deep. I have had areas of from one-quarter to half an acre in my plantation on which no scarifier was used, the only cultivation being done with the hoe. These patches have, for five years, given larger bunches than the bananas which were scarified. It appears to me that the scarifier scrapes the fine hairs or fibres off the horizontal roots, which are the chief agents in supplying nourishment to the plants. I would recommend growers of bananas to try merely chipping from a quarter to half an acre, and prove my statement for themselves. It is advisable to apply a little fertiliser after the first year of planting.”

“THROTTLE” FOR WOODY TREES.

A STEEL GIRDLE FOR FRUITFULNESS.

The County Horticultural Instructor in the Isle of Wight, Mr. C. Martin, referring to the treatment of superfluous wood in fruit trees, advocates the systematic compression of the wood of unfruitful trees that are making too much growth, in order to force them into a fertile condition. He has devised a simple form of band, bolted on one or both sides by a screw, which can be tightened at will. Mr. Martin recommends that this smooth band should be put in place when the sap is down, and holds that this method will do away with the labour of root-pruning. The “throttle” by a turn of the screws can have the pressure increased or released.

THE LATE S. C. VOLLER.

In the passing away of Mr. S. C. Voller, the Department of Agriculture and Queensland generally have lost a man of sterling qualities, possessing keen powers of observation, indefatigable in his work, considering no trouble too great in carrying out his duties, and who was always ready and willing to impart advice and give assistance to anyone in need of instruction or help in all matters relating to Fruit Culture.

The late Mr. Voller possessed the happy knack of being able to impart information owing to his sincerity and keen enthusiasm, which not only enabled him to obtain the confidence of the man on the land, but secured him many friends by whom his loss will be severely felt. Although Mr. Voller was generally known in connection with his duties as an Instructor in Fruit Culture, he, at the same time, possessed a wide knowledge of stock and agricultural matters generally, and was always ready and willing to give advice to those in need of it.

His wide experience enabled him to undertake numerous departmental duties other than those connected with the fruit industry, and when so employed his work always gave satisfaction.

Through his death the Department has lost a very loyal and reliable officer who will be greatly missed, and whose place it will be extremely difficult to fill, as it is seldom one meets with anyone possessing his all-round qualifications. He was also a facile writer and an earnest public speaker. Mr. Voller was also a valuable contributor of articles on Fruit Culture and on other industries which were always favourably received by readers of "The Queensland Agricultural Journal."

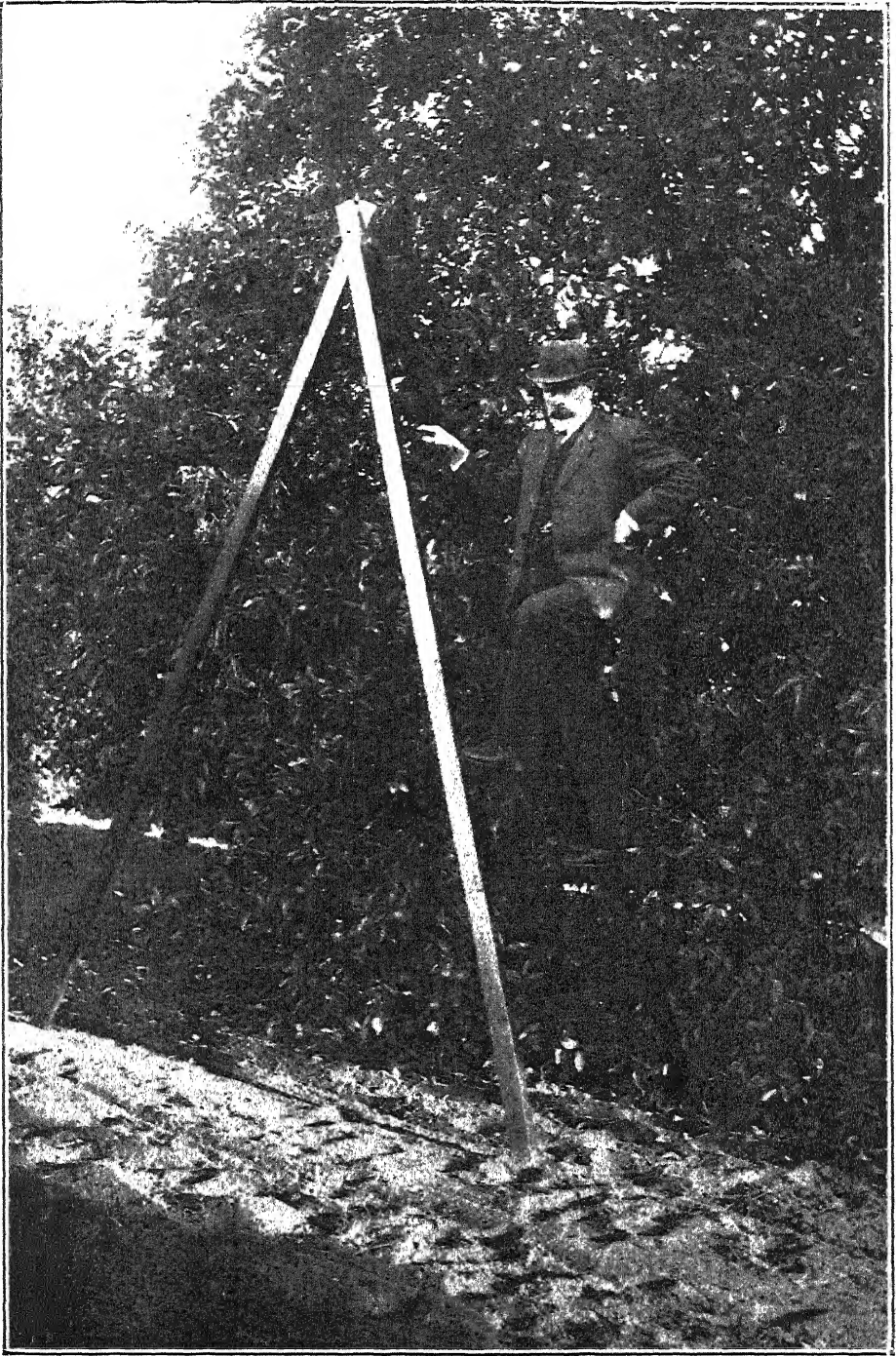


PLATE 12.

Viticulture.

PRACTICAL HINTS ON ESTABLISHING A VINEYARD.—No. 3.

By P. MAHONEY.

TRAINING AND TRELLISING.

As the plant is growing, it is very important that the growth it makes should be made the best use of and not allowed to run as Nature chooses; for, to meet with success, Nature should be assisted with a little science, such as "training."

The two topmost buds only of the plant, or cutting, should be allowed to throw out shoots, and only permitted to grow until every danger is passed, which is caused by insects that are likely to eat such young tender shoots, or by being broken off by strong winds. These dangers are generally over when the shoots are about a foot long. When they attain that length, the strongest of the two should be allowed to grow and the weaker being pruned off, leaving a cut that can heal over quickly just above the remaining shoot.

By this time the trellis should be completed, for it is necessary to have it erected by the time the vine has reached this stage, if it is desired to bring the vine into bearing early, for without the trellis-wire it is not possible to train the vine effectually.

All side shoots on the one remaining shoot should be suppressed as soon as they appear, but on no account should the leaf at the axis of the shoot be destroyed, for it shelters the young tender stem from the hot summer sun. The suppressing of side shoots should continue until the vine has got within a couple of inches of the wire. Then the vine should be allowed to grow until a few inches above the wire.

"Now is the time when good judgment is needed," for at this stage it is necessary to make an evenly balanced vine. To do so, the vine must be pinched back so as to cause two buds from below the wire to send out shoots, leaving a little of the vine above the wire, by which to keep it in an upright position, by tying to the wire. The buds from which the shoots are to come should be close to one another and as close to the wire as it is possible to get them. It makes an unsightly and unevenly balanced vine if one shoot is under and the other over the wire.

These shoots are to form the main arms, and therefore they should be carefully trained along the wire, and furnished with spurs, &c. In the event of the arms making uneven growth, it is advisable to pinch the stronger of the two back a little, care being taken not to let any one of them outgrow the other. Do not allow too big a difference to occur before resorting to checking, for too big a check is likely to cause greater difference by encouraging growth instead of checking it. Though the arms may be making even growth, benefit can be derived from pinching the ends occasionally, so as to strengthen the vine and furnish it with spurs.

The method of trellising varies, according to the nature of the vine, just as in the case of pruning. For a non-vigorous spur-pruned vine, only a two-wire trellis is required, and the bottom wire should be no lower than 27 inches from the ground, so as to allow plenty of room for free circulation of air under the vine, which is most essential in a wet district, for low-pruned vines in such districts, or country, are very subject to oidium and other numerous diseases. The next wire should be about 18 inches above the first, to support the foliage.

The cordon system is the best way to train a vigorous trailing vine, as it is hard to balance them evenly if trained on the espalier system. In spite of close attention, one arm is apt to outgrow the other if trained in the latter way. The second wire is also necessary to carry the rods and foliage.

A rod-pruned vine also requires two wires; but "the most successful way of trellising such vines" is on a T trellis, more especially where the rainfall is great, for on such a trellis the bunches hang clear of the foliage and are protected in a roof-like manner from the rains. In this manner the possible loss caused by rains can be greatly minimised, for when the bunches hang clear of the foliage, &c., the moisture can be dried out of them by the wind. If they are protected from the winds by the foliage, then the moisture, being dried out of the bunch by the heat, has a disastrous effect, in splitting the berries when in the ripening stage.

Never should a vine have more than two main arms; with four arms, the two topmost receive the greater supply of sap, as it is only natural for the sap to flow

to the highest points most freely. Thus the bottom two arms do not get enough nourishment; consequently the spurs on it get weakly and die out. They also only produce small and few bunches, compared with the top arms.

It is a golden rule with practical viticulturists to keep the fruiting wood on the same level. It is also very noticeable, in citrus and deciduous fruit-trees, that there is a better setting of fruit on a horizontal branch than on a perpendicular one.

If vines are grown on a hillside, they should never be trellised up and down the hill, except when they are trained on a cordon system, and then the vine should be trained down the hill, for that will have a tendency to regulate the flow of sap more evenly. If trained otherwise, the sap will rush to the buds at the end of the vine, and, consequently, vigorous growth will commence from them, owing to their being the highest part of the vine, and the buds or spurs lower down the vine are at a disadvantage, and, failing to get enough nourishment, they become weak, and consequently die, thus leaving a lot of barren wood on the vine. If the vine needs to be trained on an espalier system, the trellis should run across the hill (not up and down), which will give the desired results.

The systematic training of the roots is also very important, as previously stated. If the plant consists of five or a given number of buds, it is then an easy matter to know what roots to cut away. It is necessary to go round about every three months and cut away all roots which are not required, as a young well-attended plant makes roots very quickly. Breaking the roots with plough or cultivator has not the results that cutting them away has, for they continue to grow from the portion of the broken root.

[TO BE CONTINUED.]

PHOTOGRAPHING STOCK.

Few breeders appreciate the difficulties of the photographer of live-stock in securing even a decent picture of an animal. Some, indeed, appear to think that the camera can hide breed defects, ignore dirt and draggled condition, and, generally, make an animal driven into the corner of a paddock have the appearance of a show champion. Happily, breeders of this class are the exception. It must be frankly admitted, however, that owners in general, even expert herdsmen, fail to realise the importance of condition and get-up to satisfactory photographic work. There are occasions when the camera—by reason of a combination of condition, pose, light, and background—will flatter an animal, but in the great majority of cases the camera will exhibit the weaknesses with exasperating vividness. The expert photographer may be trusted to get the subject in the best position for bringing out its good qualities and to secure the best lighting effect, but it remains with the attendant to have the animal in the best possible form. In the case of cattle the coat must be clean and in as good order as possible, and the tail should be well combed out. Of course, the ground must be level, and it is well to remember that untidy fences have a habit of standing out prominently in a picture. It will invariably pay to go over the fleece of a sheep and remove any irregularities. As with cattle, the ground must be quite level, and preferably the grass should be short. It would pay the breeder to have a photographic site, with a suitable background, facing the sun, and the ground level for some distance. A general rule, and one which should never be ignored, is that patience must be exercised. Seldom, if ever, can a good picture be obtained by exciting an animal. Certainly an alert expression is always desirable, but no attempt should be made to obtain this till the photographer is quite ready to press the trigger of his camera. Some owners have an idea that it looks well to have a prize ticket attached to the headstall. In this they make a mistake. It is just possible that the photographer may secure a striking photograph of the animal, one good enough to be enlarged to serve as a photographic model of the breed, but many an editor would not use the picture because of the disfiguring effect of the award ticket. The less harness there is about an animal the better. What a caricature some of the old Clydesdale grooms do make of their horses—a case of man making himself ridiculous by attempting to improve upon the work of Nature. The owner who desires to take photographs of his own stock should not neglect the details here-enumeraled. It may happen that he may get a really good photograph of an animal, but because of failure to prepare it, and have it look as well as possible, the picture is useless for publicity purposes—a fact he may have to regret more than once. In short, to obtain a good picture the animal must be good, and it must look to the very best advantage when its image is recorded on the sensitive plate. Many of the photographs of animals sent to us for publication would do the breeder more harm than good were we to publish them, and they would prove a very poor advertisement for the live-stock of this country.—“Exchange.”

Neglected Industries.

PROSPECTS OF RUBBER-GROWING IN QUEENSLAND.

That the Pará, Ceara, and other rubber-producing plants will thrive to perfection in tropical Queensland has long been established, but when capitalists have been approached with a view to inducing them to embark on the rubber industry, the reply has always been: "How can Queensland, with its labour conditions, high rate of wages, and imminence of strikes at critical periods, attempt to compete with countries where there is an abundant supply of coloured labour, where rations are cheap, and strikes unknown, and where rich rubber lands can be obtained for a mere nominal rental, as, for instance, in Papua (British New Guinea)?" At first sight, this argument would appear unanswerable; but, when we come to figure the matter out, it can be shown that rubber-growing under white-labour conditions in this State would be almost as profitable as in black-labour countries. Without going into details, the cost of planting and of upkeep of 500 acres of rubber in Queensland, including wages, buildings, implements, fencing, &c., would amount to about £34,000, the number of trees being 75,000. These trees would be ready for tapping in the sixth year, yielding a net return of £15,000. Leaving a debit balance of £18,872. In the seventh year, the net return would be £30,000, less debit from previous year, or £11,128. In the eighth and following years the net return should be £45,000.

There will, of course, be many contingencies and unforeseen expenses to be provided for, such as, possibly, cost and upkeep of a motor launch, renewal of tools, repairs, &c., whilst the manager's and overseers' salaries still go on, the wages of the labourers being included in the cost of collecting the rubber.

As there is little likelihood of wealthy rubber companies being established in the State for a long time, if ever, let us see

HOW RUBBER-GROWING ON SMALL AREAS WILL PAY.

There are, in North Queensland, on the eastern and western coasts of the Peninsula, areas of sugar land eminently suited for rubber-growing, whilst the climate and rainfall are all that can be desired. Following is an

ESTIMATE OF EXPENDITURE AND RETURNS ON TWENTY ACRES OF RUBBER IN QUEENSLAND.

Supposing the land to have been cleared, the purchasing price may be £20 per acre, on extended terms. From the first to the sixth year the total expenditure on purchase of young trees, annual instalments, interest on purchase money, planting, and cultivation would come to about £432.

In the sixth year the trees will be ready for tapping, yielding 1 lb. of dry rubber per tree; in the seventh year, 2 lb.; in the eighth year, 3 lb. and even more, equal in that year to a return of 9,000 lb. in addition to 3,000 lb. in the sixth year, and 6,000 lb. in the seventh year. The price of rubber being, say, 3s. per lb., the cash return would be £2,700, less cost of collecting, say, 1s. per lb., £900, and about £25 for cases and freight, leaving a net profit of £1,800. During the sixth and subsequent years no cultivation is required.

Many a farm in Queensland is bordered either on one or on all sides by forest or scrub trees which yield to the farmer little beyond firewood. These could be removed and rubber-trees planted in their place. In six years' time these latter would begin to be productive, and to increase in productivity every year afterwards. The tapping process is easily learnt, as is the coagulation of the latex and the subsequent production of marketable rubber, the price of which, after the war, may fluctuate between 2s. and 3s. per lb., a remunerative price, especially where trees have reached the stage when they need no more attention in the way of cultivation, nor any pruning as do the majority of fruit trees.

Some years ago, Mr. A. Molyneux, late of the Agricultural Bureau of South Australia, who is an acknowledged authority in all matters agricultural, contributed to a West Australian journal an excellent article on "Some Minor Products for Farmers," in which he said:

"With regard to many products which might be mentioned, it will be said that the labour bestowed on their production would not be repaid in the price realised for them. That is doubtless correct if we had something better to do with our time, but it does not pay to do nothing, and the innumerable small rills of money rolling into the general income during a year will make quite a considerable amount when added up. The value of a cow and a hen is scarcely worth the attention of the man who expects to grow 3,000 bushels of wheat by the end of the season; and yet he finds that his wife makes more profit from a dozen cows and fifty hens during the year than he makes from his large fields of grain. Why is it thus? Simply because the hens keep on laying, and the cows give their dole of milk every day for the greater part of the time, whilst he only gets the one crop for all his labour. Seeing, then, that these smaller items make profit, it is desirable that we should give them some thought."

What applies to the wheatgrower applies with equal force to the dairy and general farmer, and to the sugar-grower. These all have most of their eggs in one basket. A rust year, a drought, a severe frost, and the bottom of the basket falls out, with the result that the wheat or cane farmer loses, and neither has anything to fall back upon. But with one or two subsidiary crops, such as are unaffected by seasons, work is provided for many hands, and profit for the farmer, even although losses are sustained on the main crop. The intelligent farmer need never be idle. When the wheat or the cane has arrived at a certain stage of growth, there is no more labour attached to either until harvest time. Why not devote the interval to raising some such crop as will produce the results we have here indicated?

As Mr. Molineux said: "We must try to divide our labour so that there shall be no dull round of similar occupation. It may even be a relaxation to 'knock off work and carry bricks.' We want one crop to follow another, and to learn how to harvest, and even to manufacture, such crops, so that the product shall bring approbation as well as profit to us." Both these ends can be achieved by utilising the waste places of the farm for sisal, kapok, cotton, castor oil, and similar self-cultivating crops for which, in normal times, a world's market exists. Then should we hear little of the common complaint of the unemployed, for there would be no unemployed, although there would inevitably be some "unemployable."

As an instance of what may be done in the above manner let us consider the production of

KAPOK.

This is a product for which there is a large demand in Australia, and which can be produced almost anywhere in North Queensland with little trouble and less expense. At present our supplies of kapok come mainly from Java, whence 38,000 bales (of 80 lb. each) are exported annually to Holland, Australia, China, and America, Australia taking over 8,000 bales. This kapok is often called "tree cotton," and is largely used in the upholstering trade, for stuffing furniture, pillows, bed quilts, &c. The tree producing it grows to a large size, and is propagated either from seed or cuttings taken from a mature tree. The trees may be planted on any well-drained land, on roadsides, in back yards, or on allotments where the land cannot profitably be used for other crops, or on large estates. The only cultivation required is the clearing away of brush or undergrowth. The trees grown from seed begin to bear pods in two years, and in three years will yield a fair crop. If grown from very large cuttings pods will be produced in the first year, but with small, thin cuttings, the time for bearing is the same as for seedling trees. The crops should be harvested in the dry season when the pods are fully ripe, and the seeds can be easily separated from the lint. So far, the only means adopted for clearing the lint are hand labour, but small iron mills have of late been used in Java, which will produce about 250 lb. of lint in a day's work. Four women are employed for each mill.

Now, as to production per tree. In Java there are over fifty plantations where kapok is produced as a subsidiary crop, whilst on some it is the principal crop. The yield per tree of fibre (after removal of the seed) is given in the "Indische Mercur" at from 2 lb. 3½ oz. to 111 lb. from young two-year-old trees to 111 lb. from a mature tree yielding 5,000 pods. As to value, we can find no late quotations for kapok fibre in our commercial exchanges from England. Before the war, cleaned kapok (i.e., free from seeds) was quoted at 7½d. per lb., and ordinary kapok, not thoroughly cleaned, at 6½d. per lb.

The planting of kapok-trees requires but little capital and a very small amount of labour. They require practically no care, and flourish on the poorest soil, and there is a constantly increasing demand for the fibre. Here we have a product for which there is a large demand in Australia and which can be produced almost anywhere in Central and North Queensland with little trouble or expense. There are several mature kapok-trees growing and shedding quantities of kapok in several coast towns in the North, whence seed and cuttings could be obtained. The seeds produce a valuable oil, quoted in England in 1918 at £55 per ton.

Forestry.

RATES OF TREE GROWTH.

The Acting Director of Forests, being questioned as to the rate-growth of various trees, gave the following information, which was published last month in the "Brisbane Courier":—

"An area of $5\frac{1}{2}$ acres of *Pinus insularis* was measured. The trees were twenty-six years old, and the total volume per acre was found to be 6,600 cubic feet, nearly 80,000 feet super., a result which has broken the record for rapid growth and bulk per acre, as the quickest-growing pine in Europe—known in Great Britain as the Scotch pine—takes sixty years to produce the same quantity, according to the standard records of growth which have been carefully kept there over a long series of years." (South Australian official report.)

"In New Zealand, Australian eucalypts have grown to be 60 ft. high in less than thirty years, in plantations, while a Californian paper proudly claims that the fastest growth the world has ever known was made by an Australian bluegum, at Pasadena, California, which reached a great height (figures not given), and 5 ft. in diameter, in thirty years. (Some growth.)

"At Gosford, in New South Wales, a Queensland hoop pine planted in poor soil girthed 5 ft. 7 in. at twenty-five years of age, and was estimated to contain 400 super. feet of timber.

"Turning now to Queensland, the home of the hoop and bunya pines, official records of growth don't go back for more than five or six years, so perhaps some of your readers (writes a correspondent) could give authentic information of the growth of these pines when planted for shade, shelter, or ornamental purposes as many have done round their home, both in townships and in the farming districts. As an instance, a very fine grove of bunya pine is to be found at Yandina. Perhaps some of the pioneers there can give dates of planting and present size?

"Forty years ago hoop pine seed was collected at Kin Kin in the natural pine forest for a Brisbane firm. The ultimate destination was believed to be a plantation on Moreton Island. Did this venture succeed? It is surprising that in a State so richly endowed by Nature with forest wealth as Queensland is, possessing timber trees unequalled in the world for durability, strength, toughness, and cabinet timbers which cannot be surpassed, that so very little is known of the silvicultural characteristics of these trees. This may be because all energies have been directed to exploitation, leaving reafforestation to come later. However, this problem cannot be deferred much longer, and if tree-lovers will briefly record their experiences in the growth of Queensland trees, a new, valuable, and highly interesting chapter will be added to silviculture, and will go far to remove the reproach that has been aimed at Australia that the best plantations and cultural knowledge of wattles for tan bark is to be found in Natal, and that the United States have better publications on Australian trees than Australia possesses."

TO DESTROY BORING INSECTS IN TREES.

Insert a flexible wire into the burrows and inject a small quantity of turpentine or kerosene into the latter, plugging the holes with soft wood or clay. Spraying with a lime sulphur and salt wash is a good preventive, as it acts as a deterrent to the mature insects depositing their eggs (from which the borers are evolved) on the parts sprayed.

General Notes.

THE EXHIBITION.

Beef cattle entries this year are far more numerous than in August last year, when the entries numbered 390, a record at that date. This year there are 750 individual beef cattle entries, not including fats, and more than 100 animals which did not reach the standard of qualification demanded by the National Association were rejected. The great increase in entries demanded additional accommodation, and this has been arranged for.

THE NATIONAL ASSOCIATION.

The Annual Exhibition of the Queensland National Agricultural and Industrial Association, which will open on the 12th of this month, promises to prove highly successful. In a report presented at a meeting of the Association in July, the Secretary, Mr. J. Bain, said that never in the history of the Association had the prospects for a highly successful show been better. Entries in the district exhibit sections constituted a record, there being no fewer than three A and six B Grade exhibits—Darling Downs, Wide Bay and Burnett, and Central Queensland for A Grade; and Crow's Nest, Gympie, Northern Downs, Fassifern, Kingaroy, and Wallumbilla for B Grade. District displays of fruit promised to be exceedingly good, and the Red Lands, which include all that country from Tingalpa Creek to Redland Bay, would compete as a fruit district this year. The fruit displays promised to be amongst the best yet submitted. Live stock entries were so heavy that forty new cattle stalls and yarding accommodation for over sixty head had had to be erected. The export butter and cheese classes, which last year were a record, had this year been exceeded in the classes which had already closed. Perhaps the most pleasing feature of the show would be the fine displays of machinery to be located on Machinery Hill. Quite a number of firms had secured space, and the hill would be a busy and noisy spot during Exhibition week. Owners of the best jumping and trotting studs had notified their intention to compete, and as a result the ring programme would be of exceptional interest. The demand for accommodation in the poultry and dog sections was exceedingly heavy, the same remarks applying to swine and sheep. Although entries would not close for practically another fortnight, applications already received showed that fruit and farm produce space would be taxed to its utmost capacity. The space for commercial purposes inside the annexes had been over-applied for, and in the sideshow area every inch would be occupied.

Mr. J. Beard, Instructor in the Poultry Industry, stated later that the entries in the poultry sections numbered 1,061, which constitutes a record in the history of the Association.

SOCIETIES, SHOW DATES, ETC.

Ingham.—Herbert River Pastoral and Agricultural Association. Show dates: 30th and 31st August.

Innisfail.—Johnstone River Agricultural Society. Show date, 5th October.

Longreach.—Longreach P. and A. Society. Secretary, H. J. Forrest.

Maroochy River Branch of the Queensland Farmers' Union, Yandina. Secretary, F. T. Latten, *viz* F. O. Venning.

The Maroochy Progress Association no longer exists.

Warwick.—Eastern Downs Horticultural and Agricultural Association Show date, 11th, 12th, and 13th February, 1919.

SOAPMAKING.

Replying to a correspondent, "Town and Country" gave the following recipe for making soap without boiling:—

"Take exactly 10 lb. of double-refined 98 per cent. caustic soda power, put it in a can or jar, with 48 lb. ($4\frac{1}{2}$ gallons) of water. Stir it once or twice, when it will dissolve immediately, and become quite hot. Let it stand until the lye thus made is cold. Weigh out, and place in any convenient vessel for mixing, exactly 75 lb. of clean grease, tallow, or oil (not mineral oil). If grease or tallow be used, melt it slowly over the fire, until it is liquid, and just warm; say, temperature not more than 100 degrees Fahrenheit. If oil be used, no heating is required. Pour the lye slowly into the melted grease or oil in a small continuous stream, at the same time stirring with a flat wooden stirrer, about 3 in. broad. Continue gently stirring until the lye and grease are thoroughly combined, and in appearance like honey. Do not stir too long, or the mixture will separate itself again. The time required varies with the weather, and the kind of tallow, grease, or oil used; from fifteen to twenty minutes will be enough. When the mixing is completed, pour off the liquid soap into any old square box for a mould, sufficiently large to hold it, previously damping the sides with water, so as to prevent the soap sticking. Wrap up the box with old blankets, or, better still, put it in a warm place till the next day, when the box will contain a box of 130 lb. of soap. Remember the chief points in the above directions, which must be exactly followed. The lye must be allowed to cool. If melted tallow or grease be used it must not be more than warm. The exact weight of double-refined 98 per cent. powdered caustic soda and tallow, or oil, must be taken, also the lye must be stirred into the grease, not grease or oil added to the lye. If the grease or tallow used be not clean, or contains salt, it must be rendered or purified previous to use; that is to say, boiled with water, and allowed to become hard again to throw out the impurities. Any salt present will spoil the whole operation entirely, but discoloured or rancid grease or tallow is just as good as the finest for soapmaking purposes."



PLATE 13.—ALGAROA ; OR MESQUIT BEAN.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JULY, 1918.

Article.						JULY.	
						Prices.	
Bacon	...	...	...	...	...	lb.	9d. to 10d.
Barley	...	...	...	...	...	bush.	2s. 6d. to 4s.
Bran	...	...	...	...	...	ton	£6 10s.
Broom Millet	...	...	...	...	...	"	£70 to £76
Broom Millet (Sydney price)	...	...	...	...	...	"	...
Butter (First Grade)	...	...	...	...	...	cwt.	128s. 6d.
Chaff, Mixed	...	...	...	...	...	ton	£3 10s. to £3 15s.
Chaff, Oaten	...	...	...	...	...	"	£6 to £9
Chaff, Lucerne	...	...	...	...	...	"	£8 10s. to £12 5s.
Chaff, Wheaten	...	...	...	...	...	"	£6 5s.
Cheese	...	...	...	...	...	lb.	7½d. to 10½d.
Flour	...	...	...	...	...	ton	£12
Hams	...	...	...	...	...	lb.	1s. 3d. to 1s. 10d.
Hay, Oaten (Imported)	...	...	...	...	...	ton	£9 10s.
Hay, Lucerne	...	...	...	...	...	"	£3 to £7 15s.
Hay, Wheaten	...	...	...	...	...	"	£4 10s. to £5
Honey	...	...	...	...	...	lb.	3½d. to 4½d.
Maize	...	...	...	...	...	bush.	5s. to 5s. 6d.
Oats	...	...	...	...	...	"	3s. 3d. to 4s.
Onions	...	...	...	...	...	ton	£17 to £20
Peanuts	...	...	...	...	...	lb.	4d. to 5d.
Pollard	...	...	...	...	...	ton	£6 10s. to £7 10s.
Potatoes	...	...	...	...	...	"	£8 to £10 5s.
Potatoes (Sweet)	...	...	...	...	...	cwt.	2s. 9d. to 3s. 6d.
Pumpkins (Cattle)	...	...	...	...	...	ton	£3 10s. to £4 15s.
Eggs	...	...	...	...	...	doz.	1s. 3d. to 1s. 8d.
Fowls	...	...	...	...	...	per pair	3s. 6d. to 9s.
Ducks, English	...	...	...	...	...	"	3s. to 4s.
Ducks, Muscovy	...	...	...	...	...	"	3s. 6d. to 7s.
Geese	...	...	...	...	...	"	7s. to 8s. 6d.
Turkeys (Hens)	...	...	...	...	...	"	7s. 6d. to 12s.
Turkeys (Gobblers)	...	...	...	...	...	"	12s. to 20s.
Wheat (Milling)	...	...	...	...	...	bush.	4s. 6d.

VEGETABLES—TURBOT STREET MARKETS.

Beans, per sugar-bag	...	...	...	...	...	6s. to 8s.
Beetroot, per dozen bunches	...	...	...	...	...	9d. to 1s.
Cabbages, per dozen	...	...	...	...	...	1s. 6d. to 5s.
Carrots, per dozen bunches	...	...	...	...	...	1s. to 1s. 6d.
Cauliflowers, per dozen	...	...	...	...	...	3s. 6d. to 10s. 6d.
Chokos, per quarter-case	...	...	...	...	...	1s. 6d. to 2s.
Cucumbers, per dozen	...	...	...	...	...	...
Lettuce, per dozen	...	...	...	...	...	9d. to 1s.
Marrows, per dozen	...	...	...	...	...	1s. 6d. to 3s. 6d.
Parsnips, per dozen bundles	...	...	...	...	...	...
Peas, per sugar-bag	...	...	...	...	...	7s. to 8s.
Sweet Potatoes, per cwt.	...	...	...	...	...	3s. 3d.
Table Pumpkins, per sack	...	...	...	...	...	4s. to 5s.
Tomatoes, per quarter-case	...	...	...	...	...	2s. to 5s. 7d.

SOUTHERN FRUIT MARKETS.

Article.	JULY.	
	Prices.	
Bananas (Queensland), per case	10s. to 14s.	
Bananas (Tweed River), per case	17s. to 18s.	
Bananas (Fiji), per bunch... ..	8s. to 10s.	
Bananas (G.M.), per bunch	8s. to 10s.	
Bananas (G.M.), per case	20s. to 23s.	
Lemons (local), per bushel-case	5s. to 6s.	
Mandarins, per bushel-case	3s. to 7s.	
Oranges (Navel), per case	3s. to 9s.	
Oranges (Other), per case... ..	6s. to 7s.	
Oranges (Queensland), per case	6s. to 9s.	
Papaw Apples, (Queensland), per quarter-case	8s. to 9s.	
Passion Fruit, per half-case	11s. to 12s.	
Pineapples (Queens and Roughs), per double-case	8s. to 10s.	
Pineapples (Ripleys), per double-case	6s. to 7s.	
Tomatoes (Queensland), per half-case	2s. to 6s.	

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	JULY.	
	Prices.	
Apples, Eating, per case	7s. 6d. to 12s. 6d.	
Apples, Cooking, per case... ..	7s. to 8s.	
Bananas (Cavendish), per dozen	3d. to 4½d.	
Bananas (Sugar), per dozen	3d. to 4½d.	
Cape Gooseberries, per quarter case	6s. 6d. to 10s.	
Citrons, per hundredweight	7s. to 8s.	
Cocoanuts, per sack	15s. to 25s.	
Cumquats, per quarter-case	3s. to 3s. 6d.	
Custard Apples, per quarter-case	2s. 6d. to 5s.	
Lemons (Lisbon), per case	4s. to 6s.	
Mandarins, per case	8s. to 14s.	
Oranges (Navel), per case	6s. 6d. to 8s. 6d.	
Oranges (Seville), per hundredweight	14s.	
Oranges (Other), per case	4s. to 6s.	
Papaw Apples, per quarter-case	1s. 3d. to 3s. 6d.	
Passion Fruit, per quarter-case	5s. to 8s.	
Peanuts, per lb.	3d. to 5d.	
Pineapples (Ripley), per dozen	2s. 6d. to 3s.	
Pineapples (Rough), per dozen	6d. to 1s.	
Pineapples (Smooth), per dozen	1s. to 2s.	
Pomelos (poor man's orange) per hundredweight	14s.	
Rosellas, per sugar bag	5s. to 7s.	
Strawberries, per dozen boxes	4s. to 13s.	
Tomatoes, per quarter-case	2s. to 5s. 7d.	

TOP PRICES, ENOGGERA YARDS, JUNE, 1918.

Animal.	JUNE.
	Prices.
Bullocks	£18 to £21
Cows	£16 to £16 15s.
Cows (Single) ... ..	...
Merino Wethers	43s.
Crossbred Wethers	40s.
Merino Ewes	30s.
Crossbred Ewes	35s.
Lambs	34s.
Pigs (Baconers) ... ..	...
Pigs (Porkers) ... ..	...
Pigs (Slips) ... ..	...

LONDON QUOTATIONS.

Cotton: 2s. 6d. per lb.

Rubber: Para, 3s. 0 $\frac{1}{2}$ d. per lb.; Plantation, 2s. 2 $\frac{1}{2}$ d. per lb.; Smok. d. 2s. 1 $\frac{1}{2}$ d. per lb.

THE MAIZE MARKET.

Early in July last the price of maize advanced rapidly from about 4s. 2d. per bushel, the average price at the Roma Street markets in June, to 5s. 3d. and 5s. 4d. per bushel on rail, and later, in July, to 5s. 7d. The reasons for this sudden rise are the shortage of the maize crop in the Atherton district owing to the late cyclone, the persistent dry weather elsewhere, and the impossibility of importing maize as in pre-war times from the Argentine, Java, or South Africa, whilst it is difficult even to secure freightage from the Southern ports to Queensland.

The *Brisbane Courier* (11th July) published the following Brisbane merchants' explanation of the situation:—

"In January and February the prospects for the Queensland maize crop were excellent, and everything pointed to an absolute record, but the continued wet weather upset the early crop, and dry weather caused the failure of the late grain. The middle crop, however, was a record. In January and February, with the good prospects, Brisbane merchants sold forward. They took the risk, and to-day are executing orders at prices which in most cases involve severe losses. There have been

several new features in the market, such as the entrance of New Zealand and Tasmania, which were not at any previous time maize consumers. The prices of fodder lines generally, too, are worth nothing. The oat crops in both New Zealand and Tasmania have failed, and the price of oats in Queensland to-day is £18 4s. per ton, maize being quoted at only £11 3s. 4d. Oaten chaff is quoted at £9, prime lucerne at £12, while barley, if imported from Adelaide, the only selling market, would cost £12 10s. per ton. Again, Queensland has no wheat. There is a suspicion, also, that New Zealand may have been shipping maize to America, as large quantities were going to the Dominion by every boat, it being known that there no labour troubles were to be feared, and easy shipment would be assured. Mention has been made by some of the Cairns crop, but as far as that is concerned, maize will have to be shipped to there during the last months of the year, in return for all that is exported now. Without taking the dry weather into consideration at all, it must not be forgotten that the prices of all other feed lines are high, and interfere with the price of maize. Further, rice has not been obtainable, which means that starch and a number of other lines are being manufactured from maize, and the Maize Products Company has been buying very large quantities. As an instance of the great shortage, it may be mentioned that four weeks ago there was an inquiry on the Brisbane market from America, offering for anything from 1,000 to 10,000 tons, and freight space was guaranteed. Maize in America is at 12s. 6d. per bushel, but it was pointed out to the inquirers that Queensland could not possibly supply the quantity mentioned, and that before the year was out she herself would have to seek maize from outside sources. Townsville is on the Brisbane market for maize, as are also the Northern Rivers of New South Wales, which were supposed to have had a big crop. In fact, it can be said safely that there are orders aggregating at least 150 to 200 tons on the market to-day, while there are many inquiries on the spot from local consumers. There the matter stands. In the past, Java supplied many of the manufacturing concerns, but freight space is not available from there at present, and even if it were, local merchants could not afford to buy. America, Holland, and England will take every pound of the grain that can be obtained, and the case in a nutshell is that there is a big shortage of maize throughout the world. As far as stocks in Queensland are concerned, they are only those which are being held back by the farmers themselves and those bought by merchants to fill forward orders."

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JUNE, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JUNE, 1918 AND 1917, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	June.	No. of Years' Records.	June, 1918.	June, 1917.		June.	No. of Years' Records.	June, 1918.	June, 1917.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton ...	1.69	17	0.19	0.51	Nambour ...	3.39	22	0.21	0.27
Cairns ...	2.83	36	0.38	0.38	Nanango ...	1.96	36	0.28	0.09
Cardwell ...	2.07	46	1.14	0.36	Rockhampton ...	2.05	31	0.12	0.16
Cooktown ...	2.05	42	1.33	0.30	Woodford ...	2.63	31	0.34	0.48
Herberton ...	0.99	31	0.05	0.03					
Ingham ...	2.43	26	1.05	0.48	<i>Darling Downs.</i>				
Innisfail ...	7.08	37	3.99	4.23	Dalby ...	1.65	48	0.25	0.62
Mossman ...	2.43	10	0.29	0.79	Emu Vale ...	1.40	...	0.29	0.25
Townsville ...	1.33	47	0.05	0.07	Jimbour ...	1.64	...	Nil	0.59
					Miles ...	1.96	33	0.05	0.25
<i>Central Coast.</i>					Stanthorpe ...	1.80	45	0.67	0.70
Ayr ...	1.36	31	0.04	0.42	Toowoomba ...	2.34	46	0.54	0.60
Bowen ...	1.64	47	0.07	0.61	Warwick ...	1.64	31	0.48	0.31
Charters Towers ...	1.44	36	0.01	0.04					
Mackay ...	2.73	47	2.40	0.54	<i>Maranoa.</i>				
Proserpine ...	3.92	15	0.48	1.16	Roma ...	1.68	44	0.02	0.34
St. Lawrence ...	2.52	47	0.70	0.40					
					<i>State Farms, &c.</i>				
<i>South Coast.</i>					Bungewongorai ...	1.48	4	0.02	0.40
Biggenden ...	1.92	...	0.05	0.07	Gatton College ...	1.65	...	0.22	0.16
Hundaberg ...	2.82	35	0.02	0.04	Gindie ...	1.59	...	Nil	0.49
Brisbane ...	2.59	67	0.20	0.21	Hermitage ...	1.93	...	0.91	0.40
Childers ...	2.28	23	Nil	Nil	Kairi ...	0.84	4	0.13	0.23
Crohamhurst ...	4.13	25	0.27	0.58	Kamerunga ...	2.57	...	0.44	0.35
Esk ...	2.00	31	0.42	0.27	Sugar Experiment Station, Mackay	2.44	...	...	0.64
Gayndah ...	1.84	47	Nil	0.05	Warren ...	1.59	4	0.28	Nil
Gympie ...	2.52	48	0.02	0.56					
Glasshouse M'tains	3.97	10	0.58	0.70					
Kilkivan ...	1.98	39	Nil	Nil					
Maryborough ...	2.88	47	Nil	0.27					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for June this year, and for the same period of 1917, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	MAY.		JUNE.		JULY.		AUGUST.		PHASES OF THE MOON.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6:13	5:17	6:30	5:0	6:39	5:3	6:30	5:18	The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.
2	6:14	5:16	6:30	5:0	6:39	5:3	6:30	5:18	
3	6:14	5:15	6:31	5:0	6:39	5:4	6:29	5:19	H. M. 4 May ☾ Last Quarter 8 26 a.m.
4	6:15	5:14	6:31	5:0	6:39	5:4	6:29	5:19	
5	6:15	5:13	6:32	5:0	6:39	5:4	6:28	5:20	10 " ● New Moon 11 1 p.m.
6	6:16	5:13	6:32	5:0	6:39	5:5	6:27	5:20	18 " ☾ First Quarter 6 14 a.m.
7	6:16	5:12	6:33	5:0	6:39	5:5	6:27	5:21	26 " ○ Full Moon 8 32 a.m.
8	6:17	5:11	6:33	5:0	6:39	5:6	6:26	5:21	The Moon will be nearest the earth on the 8th, and farthest from it on the 29th.
9	6:17	5:11	6:34	5:0	6:39	5:6	6:25	5:22	
10	6:18	5:10	6:34	4:59	6:39	5:7	6:24	5:22	2 June ☾ Last Quarter 2 20 p.m.
11	6:19	5:9	6:35	4:59	6:39	5:7	6:23	5:23	9 " ● New Moon 8 3 a.m.
12	6:19	5:9	6:35	4:59	6:39	5:8	6:22	5:24	16 " ☾ First Quarter 11 12 p.m.
13	6:20	5:8	6:36	4:59	6:38	5:8	6:21	5:24	24 " ○ Full Moon 8 33 p.m.
14	6:20	5:8	6:36	4:59	6:38	5:9	6:20	5:25	The Moon will be nearest the earth on the 5th, and farthest from it on the 17th. It will be 12 times its diam. north of the planet Uranus on the 1st at 7:30 p.m.
15	6:21	5:7	6:36	5:0	6:38	5:9	6:19	5:26	
16	6:21	5:6	6:37	5:0	6:38	5:10	6:19	5:26	There will be a very partial Eclipse of the Moon on the 24th June, commencing about 7:46 p.m. and ending about 9 10 p.m.
17	6:22	5:6	6:37	5:0	6:37	5:10	6:18	5:27	
18	6:23	5:5	6:37	5:0	6:37	5:11	6:17	5:27	1 July ☾ Last Quarter 6 43 p.m.
19	6:23	5:5	6:38	5:0	6:37	5:11	6:16	5:28	
20	6:24	5:4	6:38	5:0	6:36	5:12	6:15	5:28	8 " ● New Moon 6 22 p.m.
21	6:24	5:4	6:38	5:1	6:36	5:12	6:14	5:29	16 " ☾ First Quarter 4 25 p.m.
22	6:25	5:3	6:39	5:1	6:36	5:13	6:13	5:29	24 " ○ Full Moon 6 35 a.m.
23	6:25	5:3	6:39	5:1	6:35	5:13	6:12	5:30	30 " ☾ Last Quarter 10 14 p.m.
24	6:26	5:3	6:39	5:1	6:35	5:14	6:11	5:30	The Moon will be farthest from the earth on the 15th, and nearest on the 27th.
25	6:26	5:2	6:39	5:1	6:34	5:14	6:10	5:30	
26	6:27	5:2	6:39	5:2	6:34	5:15	6:9	5:31	7 Aug. ● New Moon 6 30 a.m.
27	6:27	5:2	6:39	5:2	6:33	5:15	6:8	5:31	
28	6:28	5:1	6:39	5:2	6:33	5:16	6:7	5:32	15 " ☾ First Quarter 8 16 a.m.
29	6:28	5:1	6:39	5:2	6:32	5:16	6:6	5:32	22 " ○ Full Moon 3 2 p.m.
30	6:29	5:1	6:39	5:3	6:32	5:17	6:5	5:33	29 " ☾ Last Quarter 5 27 a.m.
31	6:29	5:0	...	...	6:31	5:17	6:4	5:33	The Moon will be farthest from the earth on the 12th, and nearest to it on the 24th.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during May, June, and July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night, when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Farm and Garden Notes for September.

FIELD.—Spring has now arrived, and with it there will be the usual trouble with weeds, especially on carelessly prepared ground. Therefore, the cultivator and the horse and hand hoe must be kept vigorously at work to check the weed pests and save the growing crops as well as much future labour. Attend to earthing up any crop which may require it. There may possibly occur drying winds, dry weather, and even very late frosts, which have not been unknown in parts of this State even as late as September. Still, good showers may be looked for in October, and much useful work may be done during the present month which will go far to afford a fair prospect of a good return for labour. Plant out *Agave rigida*, var. *Sisalana* (sisal hemp plant), in rows 6 to 8 feet apart, according to the richness of the soil. All dry places on the farm, too rocky or too poor for any ordinary crops, should be planted with this valuable aloë. Especially should limestone country be selected for the purpose. If the soil is very poor, and the plants very small, it is better to put the latter out into a nursery of good soil, about 1 foot apart. Next year they will be good-sized plants. Keep down tall weeds in the plantation, and do not allow couch or buffalo grass to grow about the roots. Sisal will do no good if planted on low-lying wet land, or on a pure sandy soil. It thrives best where there is plenty of lime, potash, and phosphoric acid, all of which (except potash, unobtainable under present war conditions) can be cheaply supplied if wanting in the soil. Sisal requires so little labour from planting to maturity that it should be grown to good profit despite the high cost of white labour. The price of the fibre now ranges from £70 to £100 per ton for British East African, the Mexican being unobtainable. Sow cotton—Sea Island near the coast, and Uplands generally. Caravonica succeeds best in North Queensland. Sow maize, sorghum, imphee, mazzagua, Indian cane, prairie grass, Rhodes grass and *paspalum*, *panicum*, tobacco, pumpkins, and melons. Sugar-cane planting should be vigorously carried on. Plant sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, ginger, and canaigre, the latter a tuber yielding a valuable tanning substance. Plant out coffee.

KITCHEN GARDEN.—Now is the time when the kitchen garden will richly repay all the labour bestowed upon it, for it is the month for sowing many kinds of vegetables. If the soil is not naturally rich, make it so by a liberal application of stable manure and compost. Failing a sufficient supply of these, artificials may be used with good results. Dig or plough the ground deeply, and afterwards keep the surface in good tilth about the crops. Water early in the morning or late in the evening, and in the latter case, stir the soil early next day to prevent caking. Mulching with straw, leaves, or litter will be of great benefit as the season becomes hotter. It is a good thing to apply a little salt to newly dug beds. What the action of salt is, is not exactly known, but when it is applied as a top dressing it tends to check rank growth. A little is excellent for cabbages, and especially for asparagus, but too much renders the soil sterile, and causes hardpan to form. French or kidney beans may now be sown in all parts of the State. The Lima bean delights in the hottest weather. Sow the dwarf kinds in drills 3 feet apart and 18 inches between the plants, and the climbing sorts of 6 feet each way. Sow Guada bean, providing a trellis for it to climb on later. Sow cucumbers, melons, marrows, and squash at once. If they are troubled by the red beetle, spray with Paris green or London purple. In cool districts, peas and even some beetroot may be sown. Set out egg plants in rows of 4 feet apart. Plant out tomatoes 3½ feet each way, and train them to a single stem, either on stakes, trellis, or wire netting. Plant out rosellas. Sow mustard and cress, spinach, lettuce, endive, vegetable marrows, custard marrows, parsnips, carrots, chicory, eschalots, cabbage, radishes, khol-rabi, egg-plant, &c. These will all prove satisfactory, provided the ground is well worked, kept clean, and that water, manure, and, where required, shade are provided.

FLOWER GARDEN.—Continue to plant bulbs as directed last month. Protect the plants as much as possible from cold westerly winds, which may still occur, notwithstanding the increasing temperature. Be careful that the bulbs do not come in contact with fresh manure. Keep a good lookout for slugs. Plant out chrysanthemums, palms, and all kinds of tropical and semi-tropical plants. If hot weather should ensue after planting, water and shade must be given. Sow dianthus, snapdragon, and coleus, seed or cuttings of the latter. Roses will now be in full bloom. Keep them free from aphids, and cut off all spent blooms. This latter work should be done in the case of all flowers. If you wish to save seeds, do not wait for the very last blooms, but allow some of the very best to go to seed. If you have any toads in the garden or bush-house, encourage them to take up their abode there. They are perfectly harmless, in spite of their ugliness, and they destroy an astonishing number of insects injurious to plants. Fill up all vacancies with herbaceous plants. Sow zinnia, gaillardia, amaranthus, rock-rose, balsam, sunflower, marigold, cosmos, summer chrysanthemum, coreopsis, portulaca, mesembryanthemum, calceola, &c.

Orchard Notes for September.

THE SOUTHERN COAST DISTRICTS.

The marketing of citrus fruits, in the later districts, of the late winter or early spring crop of pines and bananas, also of strawberries and Cape gooseberries, will continue to occupy the attention of fruitgrowers. We can only repeat the advice we have so often given in these Notes respecting the marketing of all kinds of fruit—viz., to grade the fruit evenly, pack honestly, and display it to the best advantage if you want to get good returns.

September is a very important month to the fruitgrower, owing to the fact that it is usually a dry month, and that it is essential in all cases to keep the land in a high state of tilth, so as to retain the moisture that is required by the various trees that are in blossom, thus securing a good set of fruit. Where irrigation is available, it is advisable to give the trees a good watering should the ground be dry, as this will induce a good growth and cause the fruit to set well. If an irrigation is given, it should be a thorough one, not a mere surface watering, and once the land is saturated the moisture must be retained in the soil by constant and systematic cultivation. If this is done, one good watering will usually be enough to carry the trees through in good condition to the thunderstorms that come later or even to the summer rains, if the soil is of a deep sandy loamy nature.

No weeds must be allowed in the orchard or vineyard at this time of the year, as they are robbing the trees and plants of both the water and plant food that are so essential to them at this period of their growth.

There is not much to be done in the way of fighting scale insects during the month, as they are more effectually dealt with later on; but where young trees are showing signs of distress, owing to the presence of scale insects, they should be treated, the gas method being the most efficacious. Plant out strawberries.

Beetles and other leaf-eating insects often make their appearance during the month. The best remedy is to spray the trees or plants with one or other of the arsenical washes that are recommended by me in this journal. The vineyard will require considerable attention. Not only must it be kept well worked, but any vines that are subject to the attack of black spot must be sprayed from time to time with Bordeaux mixture. Disbudding must be carefully carried out, as this work is equally as important as the winter pruning, as it is the best means of controlling the future shape of the vine. A very common fault with vines grown in the coast districts is that the buds often remain dormant, only the terminal bud and possibly one other starting into growth, thus leaving a long bare space on the main rods, which is undesirable. When this takes place, pinch back those shoots that have started, and

which are taking the whole of the sap, and force the sap into the dormant buds, thus starting them into growth. This will result in an even growth of wood all over the vine—not a huge cane in one part and either a stunted growth or dormant buds on the rest.

Every care should be taken during the month to prevent the fruit-fly from getting an early start. All infested oranges, loquats, kumquats, or other fruits should be gathered and destroyed, as the keeping in check of the early spring crop of flies, when there are only comparatively few to deal with, will materially lessen the subsequent crops. Land that is to be planted to pines or bananas should be got ready now, though the planting need not be done till October, November, or even later. Prepare the land thoroughly; don't scratch the surface to the depth of a few inches, but plough as deeply as you have good surface soil, and break up the subsoil as deeply as you can possibly get power to do it. You will find that the extra money expended will be a profitable investment, as it will pay every time.

THE TROPICAL COAST DISTRICTS.

September is usually a very dry month, and fruit trees of all kinds suffer in consequence. The spring crop of citrus fruits should be harvested by the end of the month, as, if allowed to hang later, there is a great risk of loss by fly. The fruit should be well sweated, and, if carefully selected, well-graded, and well packed, it should carry well to, and fetch high prices in, the Southern States, as there are no oranges or mandarins grown in Australia that can excel the flavour of the best of the Bowen, Cardwell, Cairns, Port Douglas, or Cooktown fruit.

As soon as the fruit is gathered, the trees should be pruned and sprayed with the lime and sulphur wash, as this wash is not only a good insecticide, but it will keep down the growth of all lichens, mosses, &c., to which the trees are very subject.

Every care should be taken to keep down the crop of fruit-fly during the month. All infested fruit should be gathered and destroyed, particularly that in or adjacent to banana plantations. Watch the banana gardens carefully, and keep well cultivated. New land should be got ready for planting, and where land is ready planting can take place.

Papaws and granadillas are in good condition now, and, if carefully gathered and well packed in cases only holding one layer of fruit, they should carry well to the Southern markets if sent in the cool chamber.

THE SOUTHERN AND CENTRAL TABLELANDS.

Prune grape vines at Stanthorpe in the early part of the month, leaving the pruning as late as possible, as the object is to keep the vines back in order to escape damage from late spring frosts. All vines subject to the attack of black spot should be treated with the winter dressing when the buds are swelling; this treatment to be followed by spraying with Bordeaux mixture later on.

Where fruit trees have not received their winter spraying, they should be treated at once before they come out into flower or young growth. Where the orchard or vineyard has not been ploughed, do so, taking care to work the land down fine as soon as it is ploughed, so as to keep the moisture in the soil, as the spring is always the trying time for fruit trees.

Look out for fruit-fly in the late oranges and loquats in the Toowoomba district. Keep the orchards and vineyards well cultivated; disbud the vines when sufficiently advanced. Spray for codlin moth.

In the Central tablelands irrigate vines and fruit trees, and follow the irrigation with deep, constant, and systematic cultivation. Keep down all weed growth, and fight the red scale on citrus trees with cyanide. The objective of the fruitgrowers throughout Queensland during September and the following months is, "How best to keep the moisture in the soil that is required by the trees, vines, plants, and vegetables"; and this objective can only be obtained by irrigation where same is available, or by deep, systematic, and constant cultivation where there is no water available for irrigation.

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PART 3.

Agriculture.

COTTON-SEED FOR DISTRIBUTION.

The season has now arrived when cotton-seed may be sown to the best advantage, as, during the increasing warm weather, and stimulated by the seasonable rainfall which may be expected in September and October, the young plants will make rapid progress and yield an early crop. Although the seed may be sown as late as November, it is preferable to sow as soon as possible after the late frosts, in order to obtain the most satisfactory returns. We may recall the remarkable success achieved by cotton-growers in 1907, who sowed about the months of August and September. The following were some of the authenticated results per acre:—Wallumbilla, 2,240 lb.; Tallegalla, 4,250 lb. and 3,527 lb.; Vernor (Brisbane Valley Line), 3,006, 1,473, and 1,300 lb.; Mackay, 1,368 lb. Similar results were obtained in 1915, but only on a limited scale. The Department of Agriculture and Stock has now a quantity of first-class cotton-seed for free distribution to present and intending growers, who are advised to make early application for a supply, stating how many acres they propose to plant. The seed will be supplied free of cost and railage paid; 10 lb. of seed per acre will be allowed to provide for replants or any other contingency. An advance of 2d. per lb. for the year 1919 will be made upon all raw cotton received by the department, when it will be ginned and marketed on the owners' account, and any surplus after sale, after deducting charges, will be paid to the growers *pro ratâ*. Consignments are to be forwarded addressed to the Under Secretary, Department of Agriculture, Brisbane, who should be advised of the despatch.

EXHIBITION NOTES, 1918.

THE EXHIBITS OF THE DEPARTMENT OF AGRICULTURE AND STOCK AT THE EXHIBITION OF THE QUEENSLAND NATIONAL ASSOCIATION, BOWEN PARK, AUGUST, 1918.

Ever since the inception of the great National Show in Brisbane, over forty-three years ago, the record of the work of the National Association has been one of steady progress, and this year has seen a result which might well be considered phenomenal, both in the number and quality of the various exhibits, in the general arrangements, especially for the accommodation of the greatly increased numbers of live stock, and in the attendance of visitors from far and near. In this respect, each succeeding year has scored a record over the previous year. War, involving an increase in the price of almost every commodity of life, heavier taxation, and the calls upon the people for subscriptions for assisting in every possible manner the army of Queensland soldiers who have made, and are yet making, an undying name for themselves and for their country in the sanguinary battlefields of France, Egypt, Gallipoli, Mesopotamia, and elsewhere—all this has not had the effect of causing the National Show to be neglected. The attendance this year amounted to 155,000, and the gate-takings each day made an aggregate of £7,005. The weather during the whole week was perfect, a slight fall of rain on the last day serving merely to lay the dust. Pages full of interest to the public might be written on the exhibits, but the space available in this journal being limited, we must ask our readers to study the voluminous reports on the exhibits and prize awards, so ably presented by the daily Press, city and country.

DEPARTMENT OF AGRICULTURE AND STOCK.

It may be remarked apropos of the scope of work of the Agricultural Department that the world's war has focussed attention on the primary producer, and recognition of the important part played by the latter in the production of raw materials will establish his position more firmly than ever in the future as an indispensable adjunct and factor in the world's progress. As nations cannot starve, it is obvious when the Councils of Empire meet to discuss the question of feeding the teeming millions of consumers, and provide for the debt which humanity is shackled with for all time, that the producer must receive the consideration due to the indispensable nature of his calling.

This State, above all others, enjoys a versatility of production which will focus attention on its development. For quite a number of reasons, cultivation methods under pioneering conditions are seldom, if ever, thorough, but it goes without saying that the new era, born of present day developments, will bring in its quota of changes to the farmer, who has many difficult problems ahead of him to solve; not the least of which is the upward trend in the cost of production and the uncertainty existing as to the values of produce and stock, the sales of which represent his income. The closest co-operation is needed between the primary producer and the scientist, and it is in this latter direction that ample scope exists for the activities in field and laboratory of the trained staff of the Department of Agriculture. Science may be described as merely a knowledge of underlying principles and causes. Its application in the direction of improvement of animals and plants, and in the elucidation of the problems confronting the producer, is intimately associated with the work which the several subsections of the Department of Agriculture and Stock have in hand. It is not possible, of course, at an exhibition to illustrate all the work which is being dealt with, but an attempt has been made in the Court to demonstrate the practical bearing and utility of the department in its relation to primary production.

DESCRIPTION OF EXHIBITS.

SUGAR CANE.

The collection of canes from the Experiment Station at Bundaberg (one of a number of stations controlled by the Bureau of Sugar Experiment Stations) was classified and the characteristics of each variety described. The importance attached to the selection of the best canes for Queensland conditions is evidenced by the fact that prior to 1904 over 500 different kinds were introduced from other countries, and from 1905 to 1916 another 360 new varieties were brought here, most of them being from New Guinea. These were tested at the Experiment Stations.

In 1895 the Agricultural Department deputed the present Entomologist (Mr. Henry Tryon) to visit Papua. This officer brought 66 varieties with him, and if

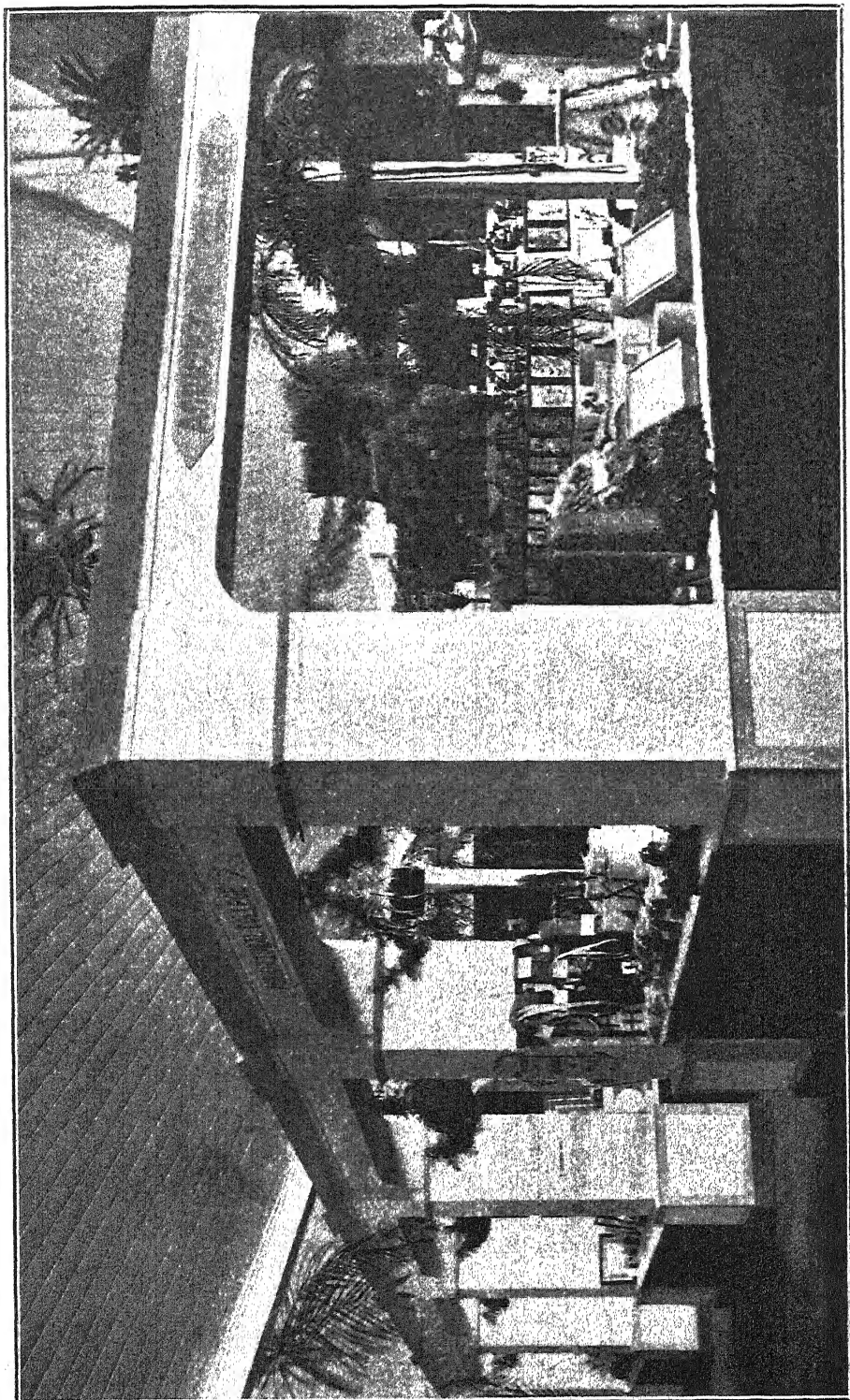


PLATE 14.—VIEW OF COURT, DEPARTMENT OF AGRICULTURE AND STOCK.

any proof of the value of such introductions is necessary, it may be stated that to-day the standard cane of North Queensland (Badila) is one of those then introduced.

This cane carries only a small percentage of fibre and is exceedingly rich, as will be seen by the analysis:—

<i>Brix</i> Total Solids.	Per cent. Sucrose in Juice.	Per cent. Glucose in Juice.	Per cent. Sucrose in Cane.	Quotient of Purity.	Available Sugar.
22.6	21.4	0.21	18.6	95.0	17.85

The method of testing these introductions, as well as that of seedlings raised in Queensland, is to grow the canes for a period of years and over a number of ratoon crops, each variety being analysed no less than four times in each year during the months of June to September. Those showing high percentages of sugar, which have proved to be good croppers and absolutely free from disease, are made available to farmers and plantations; others, light in weight and difficult to cut, being valueless from the farmer's point of view, are discarded.

Five of the original New Guinea varieties, tested over a "plant" and five "ratoon" crops, gave the following results:—

—				Total Cane per Acre. Six Crops.	Total Sugar per Acre. Six Crops.
				English Tons.	English Tons.
15	Badila	..	..	270.5	50.2
24	..	..	..	255.1	46.3
24A	..	..	..	266.7	45.6
24B	..	..	..	257.5	42.2
40	..	..	..	253.4	38.8

In addition to the introduction and testing of canes, soil investigations are undertaken at the Mackay and Bundaberg Experiment Stations and analyses made of fertilisers, limestones, waters, sugar-canes, and sugar mill products.

A new station is being established for the North of Innisfail.

The depredations of the cane grub, the larvae of the *Lepidiota* beetle, have led to the establishment of Entomological laboratories at Meringa, near Cairns, the centre of the worst grub-infested region in the North. The work is in charge of Dr. J. F. Illingworth, formerly Professor of Entomology at the College of Hawaii, and embraces the following:—

Morphological study of reproductive organs of beetles, with relation to the period of ovipositing and the number of eggs produced.

Morphological study of the fungus parasites.

Breeding of the various local parasitic and predaceous insects in cages.

Introduction and breeding of beetles parasites from other countries.

Experimental methods for the rapid multiplication and wide distribution of our fungus parasites.

Introduction of bacterial and fungus enemies of the beetles from other countries.

A further study of various light-traps for the beetles.

A further study of repellents.

Field and laboratory experiments in the use of poisons for the grubs.

Field experiments to determine the relation of fertilisers to resistance; using green manure, stable manure, meatworks refuse, nitrate of soda, &c.

It is estimated that 100,000 persons are directly or indirectly connected with the sugar industry in Queensland, and as the last season's crop was valued alone at £7,000,000 for raw sugar (£9,500,000 refined), these figures will afford some idea of its importance and of the value of the work of Experiment Stations in assisting to combat the many difficulties which beset the producers.

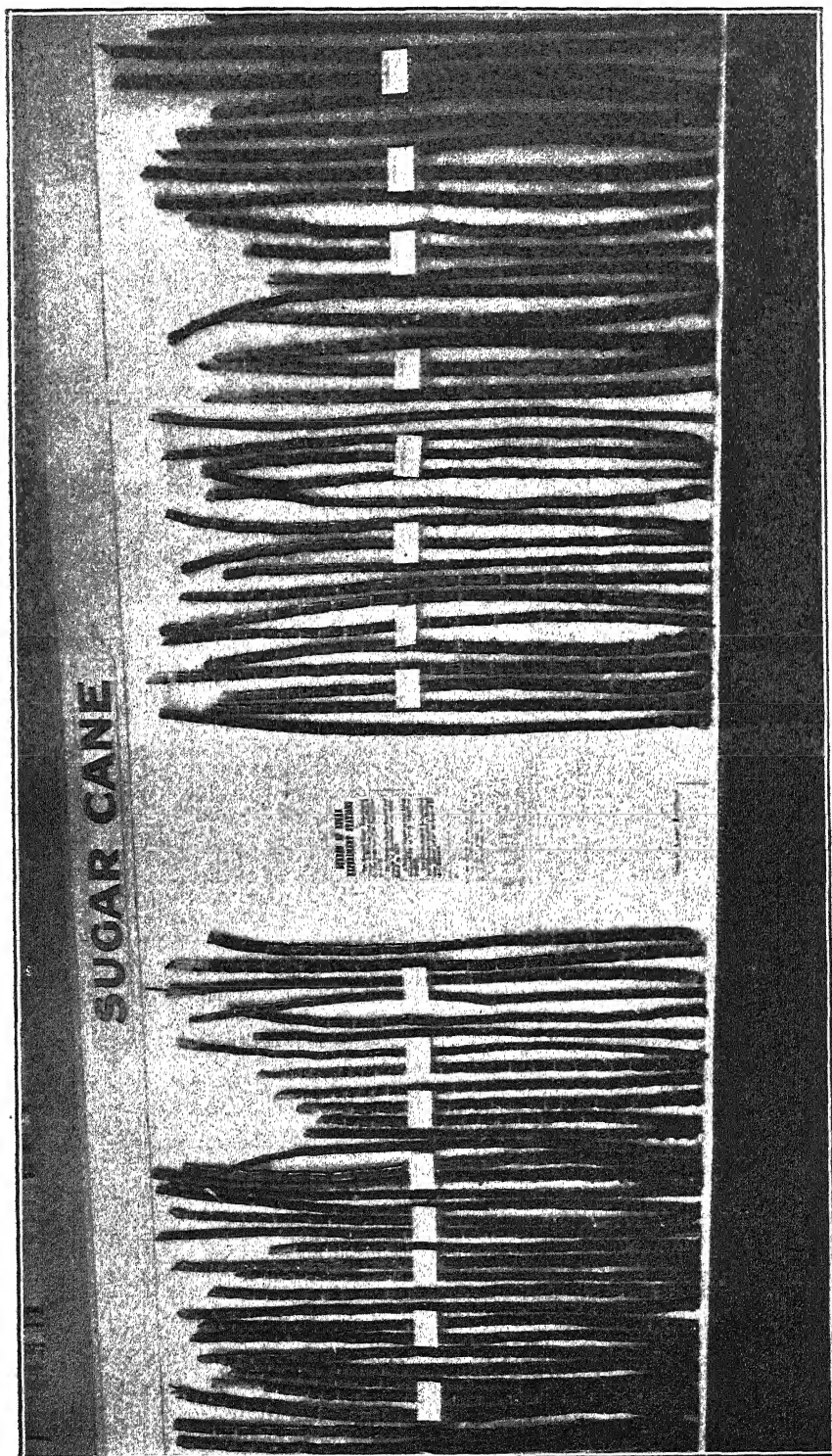


PLATE 15.—EXHIBIT OF VARIOUS SUGAR CANES RAISED AT THE BONDABERG SUGAR EXPERIMENT STATION.

AGRICULTURE OTHER THAN SUGAR.

In this section a great variety of products was staged and proved eloquent of the potentialities of the State in agricultural production.

Prominence was given to Queensland's principal cereal, maize, and the work of Departmental officers engaged in the improvement of varieties now under cultivation. This has the merit of an undertaking which must soon exercise an influence for the better on the quality and quantity of grain produced in the State.

Statistical information has been prepared showing the following:—

Yields recorded for 15 years, 1900 to 1915.

Maize selection on performance.

Shelling percentages of different varieties.

Comparisons in yield from 1914 to 1918 in the corn growing competition.

In the latter chart the average yields show a decided improvement each year, viz.—

		Per Acre.			Per Acre.
1914-15	.. ..	39.3 bushels.	1916-17	.. ..	62.2 bushels.
1915-16	.. ..	51.3 „	1917-18	.. ..	85.3 „

The principles of selection for type and productivity are illustrated, special attention being given to the factors and characteristics to be looked for in improving crop yields.

Samples of manufactured products and by-products of maize were exhibited in order to show some of the commercial uses to which the grain can be put.

The wheat exhibit comprised a collection in grain and sheaf, principally from the Roma State Farm and experiment plots, and served to demonstrate that, to produce high quality wheats suitable for Queensland conditions, they must be raised and selected here in order to secure the best for the different soils and environment peculiar to our climatic conditions.

The system in vogue in the Department is to carry out field and variety tests in different districts of the State, with the most promising varieties raised and proved beforehand at the Roma State Farm, where wheat breeding is specialised in.

Flour and by-products from wheats tested in the agricultural laboratory served to complete this section.

Several varieties of cotton were shown, including a selection of pods or bolls of one particular kind which has special characteristics stamping it as a suitable one for the employment of machines in picking. Samples of lint from this year's ginning were also exhibited. It is generally well known that on the decline of cotton-growing the Agricultural Department took up the matter of resuscitating the industry. Cotton seed is supplied free, and the resultant crop is received, ginned, and marketed on a co-operative basis, advances being made against cotton sent in for ginning purposes. War scarcity, the unlimited demand, and the high prices realisable are causing a revival of interest in the crop. Up to 31st July this year, 130,600 lb. of raw cotton have been received by the Department for ginning purposes. Sales so far have been made this season at 1s. 1d. per lb. for lint, a price which will pay the growers handsomely. Last year's lint brought 11d. per lb., and a concrete case is cited where a grower, who put in 8 acres of Upland cotton, secured a net return of £154 as a set-off against the cost of production. Ginning expenses at the rate of a farthing per lb. for raw cotton, railage and handling charges, are not included in the amount mentioned.

Sisal hemp on exhibition, raw and manufactured in the form of binder twine and ropes, was a sufficient indication of the excellent quality of the Queensland-grown article. Although the industry is in quite an embryo stage, the possibilities are manifest when it is known that the present quotation for sisal fibre has more than doubled since the war.

Broom millet formed the subject of an educational display, specially prepared to draw attention to the possibilities existing in the State for raising quantities of first quality "fibre" to meet the shortage the Commonwealth is now suffering from. Prime hurl is worth £90 per ton in Sydney. As crops of half-a-ton per acre can be expected under favourable climatic conditions, prospective growers have an excellent chance ahead of them, provided prices keep up.

A small exhibit of Japanese Upland rice and rice paddy, representing 60 acres of crop harvested recently at Tolga, North Queensland, showed that this cereal can be produced to perfection in the State. As good returns have been secured and the crop is capable of being harvested and prepared for market with labour-saving machinery, the future of the industry seems assured, and colour is lent to this optimistic opinion by the fact that other farmers in the vicinity of Tolga intend planting additional areas this season.

GRAIN OR DRY-DISTRICT SORGHUM.—These drought-resistant plants have not yet been taken up for stock feeding purposes to the extent which their excellent cropping and utility deserves. In America several million acres are cropped annually. The grain of these sorghums is large and the yields exceptionally high: drought-resistance, and ability to produce crops of grain under trying conditions where maize would fail, stamp them as worthy of attention by poultry farmers, dairymen, and pig raisers. Horses are very fond of the seed, which, from a feeding standpoint, is midway between the wheat and maize. Yields obtained upon Departmental plots ranged from 85 to 103 bushels per acre, the latter quantity being secured from Cream Milo. A system of improvement and selection of high-yielding strains is being carried on by the Department, and seed ears, sheaves, and grain of several varieties were on exhibition.

TOBACCO.—Pipe and Turkish leaf from Inglewood and cigar leaf from Bowen represented samples of the high-class tobaccos which are grown in the districts named. The Department has imported seed of the most favoured kinds from America to enable growers to secure supplies.

FODDERS.—A collection of fodders suitable for green feed, hay, or ensilage has been made, comprising sorghums of sorts, some of which yielded up to 32 tons per acre of green feed on a field test plot; Soudan grass, and other popular drought-resistant fine-stalked sorghums; also *Setarias* and *Panicums* representing suitable catch crops of rapid growth which are deserving of every attention from stock-owners.

Farm and garden seeds were in great variety, indicating that many kinds can be satisfactorily grown in the State, a matter which deserves more consideration than it now receives. Cowpeas, standard varieties and others, raised by cross fertilisation, illustrated a branch of work in hand at the Roma State Farm which gives promise of improved kinds for green manuring, fodder, and seed purposes. The merits of the plant entitle it also to more attention, as it is suitable for a variety of purposes, not the least of which is its natural richness as a food for pigs when kept under the paddock system.

Latterly some recognition has been given to flax (linseed) growing in Queensland, more on account of the value of the plant for oil-producing purposes than for fibre; consequently an exhibit of different varieties was made.

Buckwheat was also shown in sheaf and seed to draw attention to the plant, which is useful for honey-producing purposes in a minor degree, and for pig-raising and stock-feeding purposes.

The Juvenile Corn Growing Competition and the excellent collection of maize ears sent in to be judged for uniformity of type and character of grain was, in its class, a feature of the exhibition. The average yield, 85.3 bushels per acre, obtained in this competition stamps it as being the most successful from the standpoint of yield of any so far held. The winner of the competition is E. V. E. Burton, of Boobie, who secured the phenomenal return of 169.6 bushels per acre. The second and third highest aggregate reached 153.3 and 145.1 bushels per acre, secured by two brothers named Gon Chee at Killarney.

ENSILAGE.—Several samples taken from silos and stacks represented a class of succulent fodder which all dairymen should have on hand as a set-off against dried-out pastures. The stacks from which the ensilage was taken were constructed under the supervision of Departmental dairy inspectors, whose efforts in this direction appear to be very much appreciated by stockowners.

An interesting exhibit of sugar-cane ensilage, representing 40 tons made in a reinforced concrete silo at Kairi State Farm, North Queensland, showed a new use for cane, in which form it makes a highly palatable fodder.

The *Seed Exhibit* drew attention to the Pure Seeds Acts, which prescribe standards of purity and germination for agricultural and vegetable seeds, and many farmers now avail themselves of the services of the Seed Laboratory before either buying or selling seeds for sowing. The work in this direction is ever on the increase, and the National Show gave farmers and others an opportunity to examine a standard collection of seeds, and to correct many errors that creep in by the misnaming of well known varieties.

It is possible for many people to somewhat resemble the small boy, who, after three weary weeks in learning the alphabet, was asked by his teacher to name a certain letter. After some moments' thought, he replied that he knew him by sight, but did not know his name. The named collection of weed seeds, if examined for a few minutes, should be the means of giving much information.

In order to get into close touch with farmers and others interested in seeds, an officer of the Department was in attendance at the exhibit, and it was suggested that farmers, if possible, make it a point to have a few minutes with him during the week.

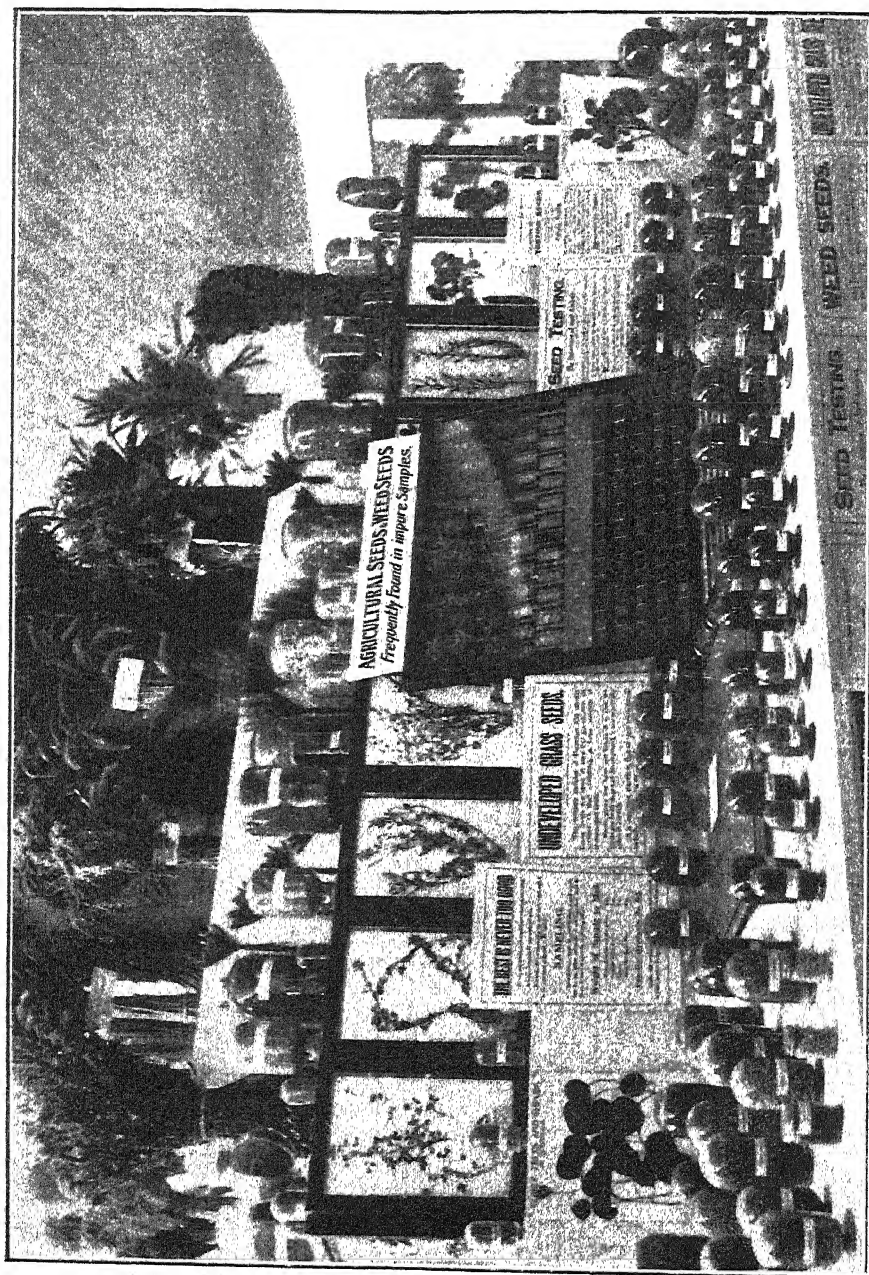


PLATE 16.—PURE SEEDS AND SEED-TESTING EXHIBITS.

The simple method of seed testing demonstrated is one of the easy ways in which all cereals could be tested for germination. In the farmer's own interest, he cannot afford to buy or sow any but the best, and much good would result if all buyers placed quality before price, and obtained a thorough knowledge of the article before either buying or selling.

Seeds are the most variable article the farmer has to do with, and farming, like any other business, cannot afford to leave doubtful points to chance.

The ingenious author of "Gulliver's Travels" mentions the high repute in which those Lilliputians were held who made two blades of grass grow where only one grew before. It is a somewhat lengthy journey from the regions of Lilliput to Queensland, yet one of the wild chimeras of choosing for employments persons qualified to exercise them appears to have been solved in the excellent educational display of the Department of Agriculture and Stock at the National Show.

QUEENSLAND AGRICULTURAL COLLEGE.

This year the College was represented in the Agricultural Court by an exhibit illustrating various features of the instructional work carried out for the students—the Dairy Factory, Sheep and Wool, Seed Testing, Saddlery, Blacksmithing, and Farm sections.

In the Live Stock Division the College was represented by the following:—

Dairy Cattle: Ayrshires, Holsteins, Guernseys, and Jerseys, a total of twelve animals. Amongst the Ayrshires "Auntie's Lass," last year's reserve champion, was brought down; also "Prim," last year's champion Holstein cow, and a young Holstein bull, recently imported from New Zealand. In all cases the stock were good and they well represented the quality of dairy stock that are being bred at the College.

In the pig section, twelve animals were exhibited, representing two breeds, Berkshires and Middle Yorkshires, which included animals recently procured in the South, and others College-bred.

With the poultry section the College again had its full-size model poultry pens on exhibition in Petrie's Paddock. Since erecting these pens at last year's National Exhibition, the College has adopted the design for all new poultry buildings, and in actual practice these classes of pens have proved themselves in every way efficient.

Besides this, there was a large exhibit of crossbred table poultry. Some of the male birds had been caponised and were shown alongside the entire birds to illustrate the many advantages of caponising. In fact, the whole exhibit in this section was intended to stimulate interest in table poultry and to demonstrate the value of caponising. A brief pamphlet on this latter subject was available for distribution.

WOOL EXHIBIT.

The exhibit this year comprised a number of fleeces of farmers' wool grown mainly on coastal areas; also representative fleeces of pure-bred British breeds which are being used in raising fat lambs. A number of cases were shown which contained samples of various breeds of wool grown in Queensland; also staples of South Australian rams' wool from sheep which are being used to improve the Gindie State Farm flock. Decorative panels of scoured merino, crossbred black wool, and crossbred greasy wool, were most informative.

The fullest possible information was given, on plainly printed placards, of matters interesting to sheep farmers, some of which may be mentioned hereunder:—

Signs of Worms in Sheep.

Arsenical Drench for Wormy Sheep.

Suggestions for Combating the Blow-Fly in Sheep.

A résumé of the results of the handling by the Department of small farmers' wool clips for the past year.

The matter of worms in sheep has been a very serious question in nearly all parts of Queensland this year, and it is safe to say that more losses have occurred from this cause than any other, especially in the case of animals under two years of age. Generally, it has been found that serious losses have occurred before advice was sought; this being due to the fact that, outside the districts which have hitherto not been free from the trouble, there is little or no knowledge regarding internal parasites. The instructions given on the matter of recognising the plague were short and clear.

In the second placard, one method of treatment effectively used by the Department was given. This takes the form of a prescription containing arsenic and Epsom salts. Further information in regard to this matter was supplied by an official who was in attendance at the exhibit.

Closely allied to the question of internal parasites, such as stomach worms, is the matter of external parasites, such as the blow-fly. In the experiments conducted by the Department for the past four years several positive facts have emerged.

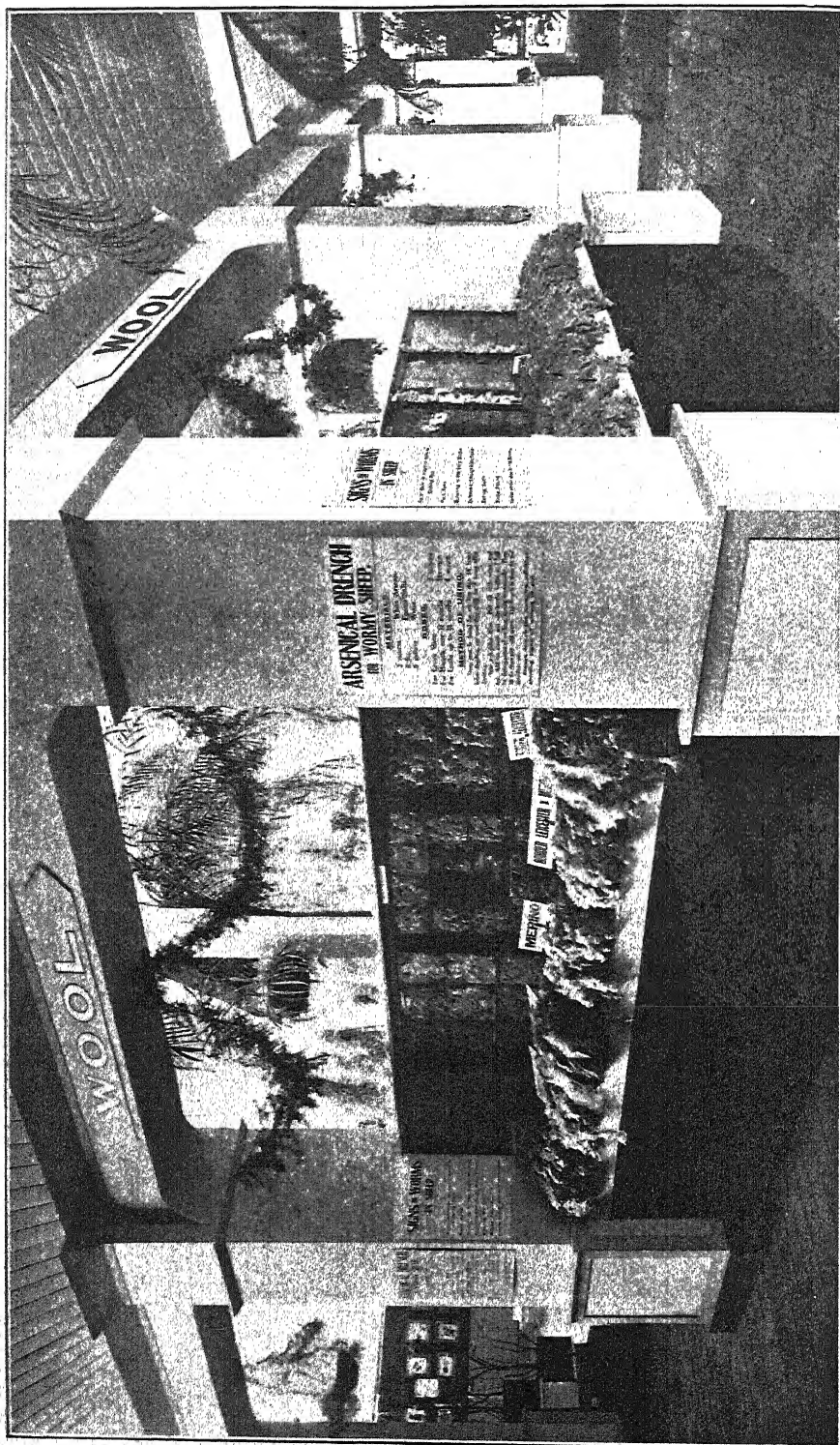


PLATE 17.—WOOL EXHIBIT.

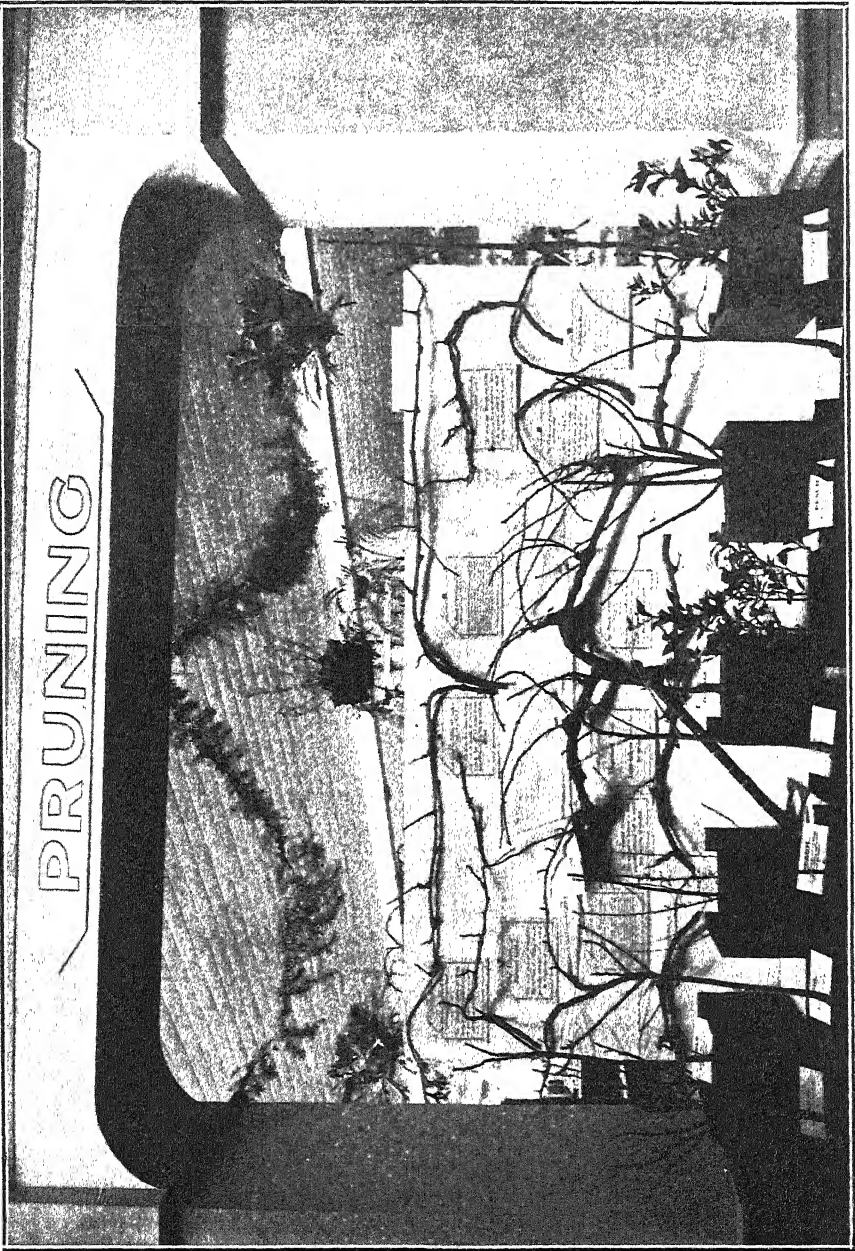


PLATE 18.—AN OBJECT LESSON IN PRUNING VINES AND FRUIT TREES.

First, that a healthy sheep is less liable to be struck by flies, and if struck, is less liable to die. Therefore, the first duty of a sheep farmer should be to see that, at least, his sheep are not dying of stomach worms.

Secondly, the use of poisonous dips is clearly of advantage. In the latest figures supplied by an experiment now being conducted, the gross infestation by flies in a flock of nearly 1,000 stud merino ewes is shown to be 7.32 per centum. Of those treated in various ways with poisonous dips, the different flocks of 50 sheep showed infestation from .0 per centum up to 14 per centum, while the controls which were quite untreated showed an infestation of 30.3 per centum. This result agrees with former experiments held in quite another district.

Other advice also appeared on the placards, representing the results of practical experience which are given for the benefit of sheepowners.

Thirdly, though some years show that even a small infestation on an animal is very likely to cause death, this year the whole body of an animal may be involved and yet the animal lives. This points either to the fact that a special organism, or a special kind of fly, is absent this year. This matter will be thoroughly investigated.

Another placard showed that a fairly large number of farmers have availed themselves of the departmental scheme for handling small farmers' clips, about 360 bales having been dealt with, which represents the pooled clips of 122 farmers. General satisfaction has been expressed, and it is confidently hoped that the business will expand. To that end the Department is now fitting out a thoroughly equipped wool-sorting shop at the offices, William street. This will be ready for the coming season in a short while.

Attention has been called by the Wool Committee to the poor get-up of many Queensland clips. This adds seriously to the difficulty of putting a fair value on a consignment, and it is for this reason that mixed clips of merino and crossbred, such as the smaller sheep farmers possess, should be graded if the best results are to be attained. This the Department is aiming to do for farmers with under 1,500 sheep. Added advantages to the farmer are: lower charges per lb. for commission, brokerage, &c., skilled manipulation of his wools, and an immediate advance of 60 per centum on receipt of wool at the Departmental Stores, William street. Full particulars were shown of the scheme in the placard. The value of the wool industry to Queensland was shown by figures for 1917-18—312,418 bales of wool were assessed in Queensland, somewhere in the neighbourhood of £5,500,000 sterling. The difference between a good "get-up" and a bad, may sometimes be 2d. per lb. Therefore, the importance to owners of having their wool well treated is obvious.

DISPLAY OF PRUNING, PROPAGATION, Etc.

This section of the Horticultural Branch had for its object the instruction of amateurs and young orchardists in the methods of propagating, pruning, training, and treatment of young fruit trees from the seed bed and nursery row to the transplanted tree. The exhibit also comprised examples of various systems of pruning and training grape vines and orchard trees. It illustrated also how to treat seedlings and maiden stocks and showed the progress of budded and grafted plants and cuttings up to the time of their permanent establishment in the orchard.

EXHIBIT OF WEEDS, GRASSES, AND FODDER PLANTS.

The attention of agriculturists, pastoralists, and horticulturists was invited to a representative collection of weeds mounted and framed, comprising over 100 kinds, a large percentage of which, it may be noted, are not indigenous but have been introduced at different times by various agencies. Some came as ornamental plants and have strayed from cultivation; others in straw or hay that had been used as packing material, or mixed with flower or vegetable seeds. This latter source is now controlled by the operations of the Pure Seeds Acts. Amongst those introduced as garden plants may be mentioned the *Ageratum* or "Billy Goat Weed"; *Argemone mexicana*, the prickly or Mexican poppy; the lantana, and the *Asclepias curassavica*, redhead or milky cotton bush; all these plants are still listed in European seed catalogues for sale. *Eriogonum linifolius*, the rag weed; *Tagetes glandulosa*, stinking roger; and *Bidens pilosa*, the cobbler's pegs, are shown; they are well known troublesome weeds of newly-cleared land or neglected cultivations. *Phytolacca octandra*, the ink weed, an American pest, and *Erechtithites*, the Commonwealth weed from Brazil, are a nuisance on newly fallen scrub land that is being allowed to dry for burning, as the dense succulent growth of these pests smothers what would otherwise be an excellent burn-off. All these weeds, most likely, came in seeds imported for garden or field culture. The khaki weed from South Africa is another unwelcome visitor. It has a dense-growing trailing habit, and, being armed with sharp burrs, it causes great annoyance to stock when dry. A notable weed—weed only when in places where it is not required, such as on tennis or other lawns—



Stylosanthes mucronata, is very common about Townsville, growing flat on the ground, forming a thick carpet. On analysis by the Agricultural Chemist, at the instance of the late Mr. G. Tucker, Deputy Chief Inspector of Stock, it was found to be quite equal to lucerne as a fodder; and milking cows do really well upon it. In the collection was a number of weeds that are truly noxious on account of their poisonous properties, and they should be taken special notice of by stockowners. Amongst these may be mentioned *Gastrolobium grandiflorum*, the wallflower or heart-leaf poison bush; *Eremophila maculata*, the native fuschia; the *Datura* or thorn apples, and *Erythrophoeum Labouchei*, the iron-wood; this latter is very poisonous, even goats having been known to die within a few hours after eating it. Many of the *Cassias* are often sent in under various names, such as wild senna, arsenic bush, &c., as being harmful to stock. They are not likely to be poisonous, but coming as they do, from the family that produce the cascara and senna leaves, are mostly all purgative in their action. Each specimen was labelled with the botanical and common name, and information was also given as to its uses and properties.

Grasses.—A large collection of grasses was shown in fair-sized sheaf form, and as they show that our State well deserves its reputation of having very rich native pastures, a brief reference to some of the more noticeable kinds might be made. The *Andropogon* or blue grass family is well represented with several kinds. *Andropogon sericeus*, the blue grass, and *A. ciliaris*, the satin-top, are both very quick to respond to a shower of rain after a dry spell. The *Astrelas* or Mitchell grasses were shown in four kinds—viz., the common Mitchell, the curly, the wheat-eat or bull, and the wire Mitchell. These are the great stand-by grasses of our inland plains country, keeping good as they do in a dry state for a very long time, and it is wonderful to see how the apparently dead tussocks of these grasses respond to rain after quite a long drought. The *Anthistiras* contain the well-known kangaroo grass, *A. ciliata*, and the tall-oat grass, *Anthistiria avenacea*, both rather coarse in growth, but when young relished by stock. A near ally, the red Flinders, *Iseilma Mitchellii*, is often found growing in the shelter of the Mitchell grass; it is a favourite food of sheep and cattle when in a dry state, and if cut and stacked makes splendid hay. A large number of *Panicums* and *Setarias* were shown. These are all good fodder grasses, and the seeds are much sought after by the galah, cockatoos, and other birds. Attention was drawn to the blady grass and its suitability for paper-making. The *Eriochloa* contain the early spring grass and the dairy grass. Both are amongst the very first to grow after rain, and are soft, succulent, good cattle grasses. Several *Paspalums* were shown, and native *Sorghums*, although coarse in growth, are good feed for cattle when young. Grasses that are a pest under certain conditions are *Heteropogon contortus*, the bunch spear grass; some of the *Aristidas*, the three-awned spear grass; and *Stipa setacea*, called the Southern spear grass; they are all very objectionable to the woolgrowers.

NAMING OF SPECIMENS.—The Department is always willing to assist interested persons by identifying and reporting on any specimen that may be sent in.

Forage Plants.—A remarkable and valuable feature of Australian vegetation is the large number of trees, shrubs, and herbage generally, apart from grasses, of the inland country, that are edible for stock. The collection shown by the Department, gathered in the Charleville and Wallumbilla districts, proved interesting and instructive to pastoralists and stockowners generally. Those of special note are the mulga, kurrajong, apple-tree, wild orange, native pomegranate, beelah, emu bush, mustard bush, whitewood, myall, and several saltbushes. These and many others have helped to keep stock not only alive but in good condition during long spells of dry weather when grass was very scarce.

It is desirable that more attention should be paid to these valuable plants.

YEERONGPILLY STOCK DISEASES EXPERIMENT STATION.

Collection of specimens illustrative of the various diseases (common and obscure) of cattle, sheep, horses, pigs, and other animals. These include tuberculosis, actinomycosis, pleuro pneumonia, tick fever, contagious mammitis, strangles, blackleg, swine fever, &c.

Another interesting section is that dealing with certain investigations into the souring of hams and bacon, commonly known to butchers as bone taint. This very serious trouble is caused by a specific germ, a spore-bearing bacillus.

This germ will grow readily in the absence of fresh air, and at very low temperatures. During its growth in and around the bone it generates gas. This was well seen in the culture tubes of pork gelatine media. Coloured drawings of this bacillus were also shown.

A special feature is made of blackleg vaccine, prepared at the Laboratory at Yeerongpilly, and where the closest scrutiny is given to the instruction supplied with each lot of vaccine, 100 per cent. results are obtained.

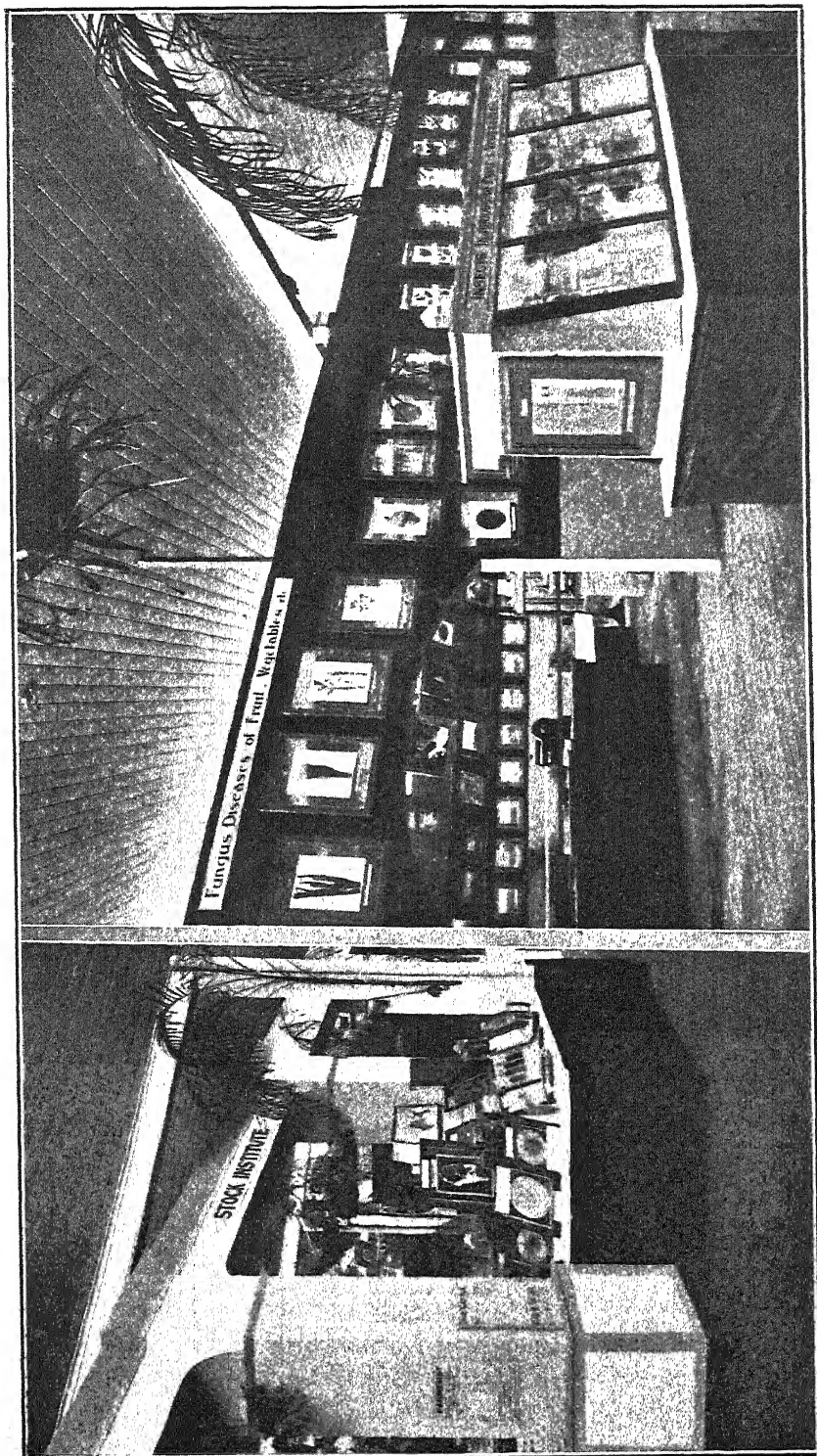


PLATE 20.—EXHIBITS OF THE STOCK INSTITUTE AND PORTION OF THE ENTOMOLOGICAL EXHIBIT.

During the past seven years, of 45,000 calves treated with this vaccine, only thirty animals were reported to have died subsequently from blackleg disease.

An interesting and instructive part of the exhibit was that dealing with the progress of tick eradication in the United States of America. This comprised several coloured maps showing the country originally tick-infested, and that cleaned up during the past eleven years. On 1st July, 1906, there were 728,565 square miles tick infested, and on 1st December, 1917, 379,312 square miles, or more than one-half, were released from quarantine restriction.

Other exhibits of the Laboratory were specimens of pure cultures of lactic acid bacteria for the purpose of making starters to be used in the manufacture of cheddar cheese; also cultures of penicillium mould, used in the manufacture of stilton and similar cheeses.

CORNGROWING COMPETITION.

Amongst the main staples of agricultural production in Queensland, next to sugar, maize is one which, considering the large area of the State in which this cereal can be profitably produced, should take a high place. It may truly be said that the maize-belt means the whole State. Hence, it is a universal crop with farmers in all parts, be the climate temperate, sub-tropical, or tropical. It is practically the first crop a farmer can plant on newly-cleared scrub land, and yields good returns even when its cultivation on such lands demands laborious hoe work. On all the coast lands, on the rich hill-sides of the Dividing Ranges, and over the whole vast extent of the Darling Downs, away out towards Cunnamulla and Thargomindah, on the Maranoa, the Fitzroy, the Mary, the Gilbert, and the Barron Rivers, away out at Camooweal—in fact, everywhere—maize is king. Vast quantities are raised in the Far North on the Atherton scrub lands. Notwithstanding the indisputable fact that climatic conditions are everywhere favourable to the production of heavy crops, what do the statistics published year after year reveal as to the average yield of maize throughout the State? In 1916 the average was only 16.64 bushels per acre. During the ten years from 1907 to 1916, the highest average yield was 24.97 bushels in 1913; in 1909 and 1915, the average was recorded to be 18.96 and 13.68 bushels per acre, respectively. The highest total production for any single year amounted to 4,260,073 bushels in 1914 from 176,372 acres, the average being 24.16 bushels per acre.

With the object, *inter alia*, of increasing the per acre yield of this important crop, the Department of Agriculture and Stock, in 1914, inaugurated a corngrowing competition to encourage an interest in the improvement of our methods of maize cultivation, and, as a preliminary, the co-operation of the school children of the farming districts of the State was enlisted. This competition was open to all under the age of eighteen years who were resident in Queensland. Competitors had absolute freedom as to the choice of ground and cultivation methods. The department supplied the necessary seed, which was of the same variety in each district. Prizes valued at £5, £2, and £1 were given for each district, with special prizes to the value of £10, £5, and £3, which were to be awarded to the competing growers who should stand first, second, and third in the entire competition. The response was excellent, not less than 296 nominating themselves, amongst whom were 15 girls.

Notwithstanding the bad climatic conditions after the competition grain was planted, some very good yields resulted, as much as 92 bushels per acre having been reached, and other competitors produced from 31 to 69 bushels. In the second year's competition, which was keenly contested, the returns ranged from 39 to 92 bushels per acre. Still higher records are shown as a result of the competition in 1916-1917, several of the juvenile growers raising over 100 bushels up to 107 bushels per acre. Taken as a whole, this year's (1918) competition has been the most satisfactory of any yet held, the yield being exceptionally high (as much as 169 bushels per acre) as will be seen by the following table of results:—

Out of 136 competitors who planted up their plots 67 compiled with the rules and regulations. Taken as a whole, this year's competition has been the most satisfactory of any yet held, as the yields are exceptionally high throughout. A summary of the yields is as follows:—2 plots returned from 30 to 40 bushels per acre; 4, 40 to 50 bushels; 6, 50 to 60 bushels; 14, 60 to 70 bushels; 8, 70 to 80 bushels; 3, 80 to 90 bushels; 10, 90 to 100 bushels; 6, 100 to 110 bushels; 5, 110 to 120 bushels; 5, 120 to 135.9 bushels; 3, 145 to 169.6 bushels. (No yields were recorded between 135.9 and 145 bushels per acre.) The average yield for the competition plots is 83.5 bushels, whilst that of the State is under 25 bushels per acre.

Mr. H. C. Quodling (Director of Agriculture) states that the returns in these competitions for the last four years show a distinct average rise, thus demonstrating the advantage of using high-class seed in order to improve production. The average yield in the competition in 1914-15 was 39.3 bushels per acre; this rose to 51.3 bushels in 1915-16, then to 62.2 bushels in 1916-17, and now to 85.3 bushels in 1917-18.

Prizes were offered for the yield per acre, quality of the grain, and uniformity of ear, and the keeping of records showing field data. Following were the results:—

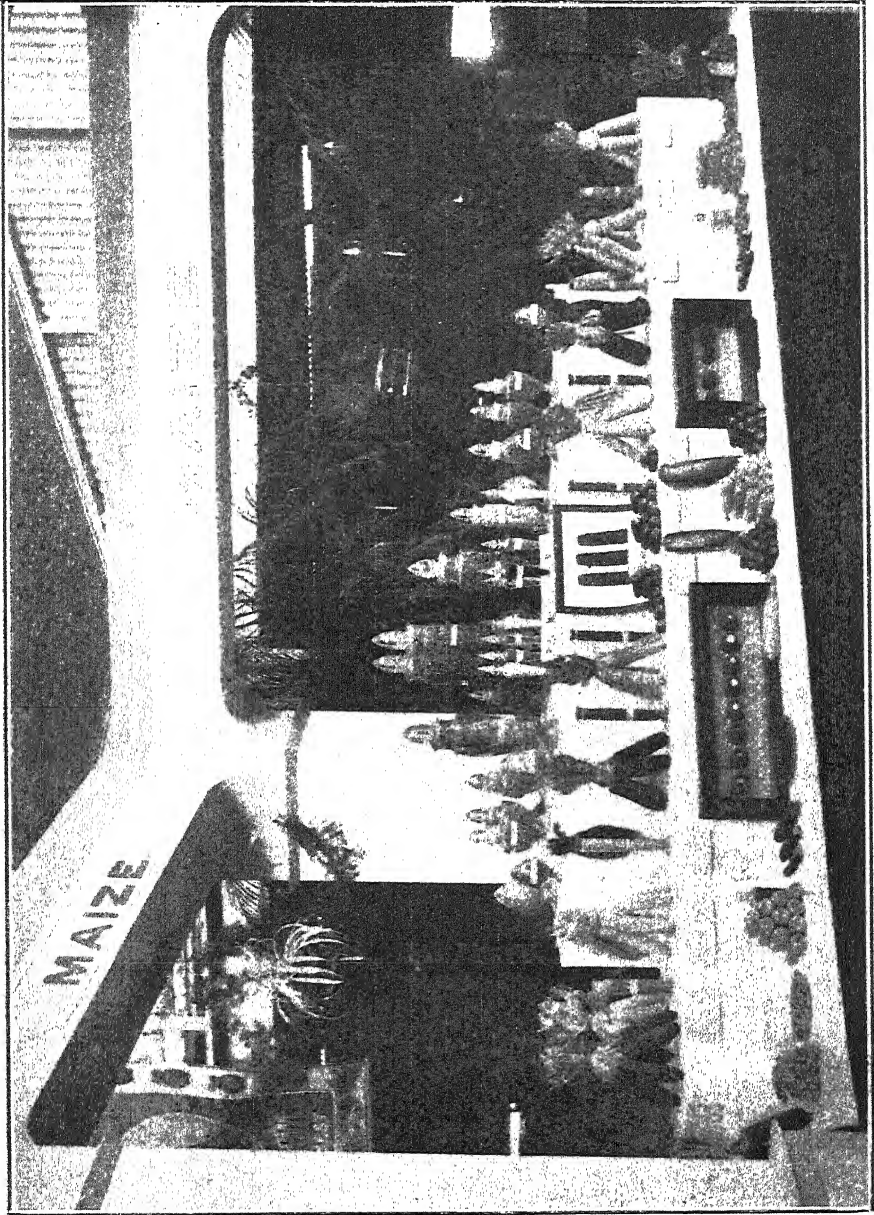
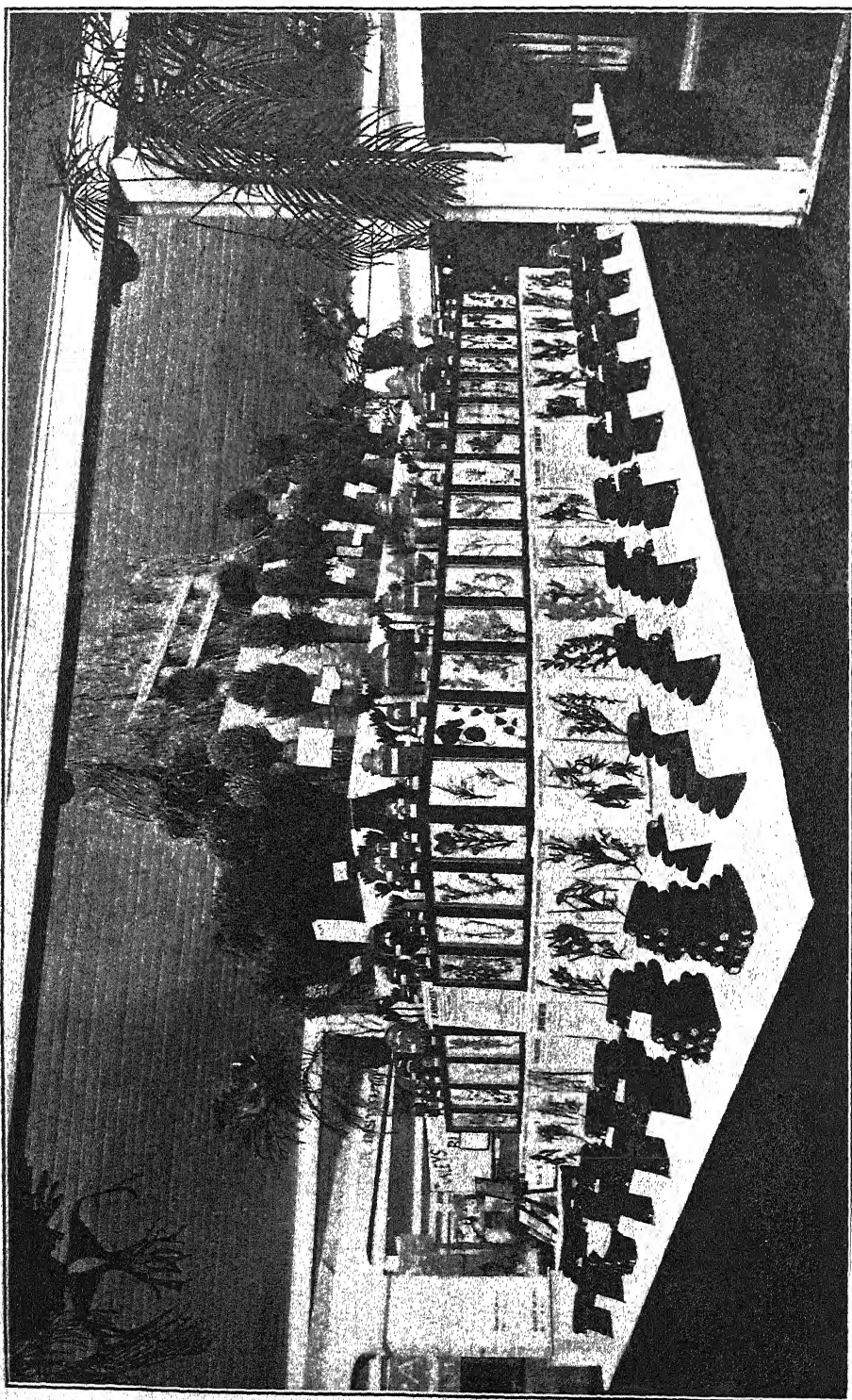


PLATE 21.—MAIZE EXHIBITS, INCLUDING MANUFACTURES FROM MAIZE.



JUVENILE CORNGROWING COMPETITION, 1917-18.

Out of 136 competitors who planted up their plots, 67 complied with the rules and regulations.

Taken as a whole this competition has been the most satisfactory of any yet held, as the yields are exceptionally high throughout.

A summary of the yields is as follows:—

2 plots returned from	30 to 40	bushels per acre.
4 plots returned from	40 to 50	bushels per acre.
6 plots returned from	50 to 60	bushels per acre.
14 plots returned from	60 to 70	bushels per acre.
8 plots returned from	70 to 80	bushels per acre.
3 plots returned from	80 to 90	bushels per acre.
10 plots returned from	90 to 100	bushels per acre.
6 plots returned from	100 to 110	bushels per acre.
5 plots returned from	110 to 120	bushels per acre.
5 plots returned from	120 to 135.9	bushels per acre.
3 plots returned from	145 to 169.6	bushels per acre.

(No yields were recorded between 135.9 and 145 bushels per acre.)

The average yield for the competition plots is 83.5 bushels, whilst that of the State is under 25 bushels per acre respectively.

RESULTS OF THE COMPETITION.

SPECIAL PRIZES.

Name and Address.	Age.	Yield per Acre in Bushels.	Points Awarded for Yield. Maximum Points, 75.	Quality of Grain and Uniformity of Ear. Maximum Points, 15.	Records. Field Plot, 10 Points.	Total Maximum Points, 100.	District Prize.
No. 4 District— E. V. E. Burton, Booie ..	18	169.6	74.8	8.6	6.0	89.4	1st, £10
No. 5 District— G. E. Gon Chee, Killarney ..	16	153.3	67.6	10.1	5.5	83.2	2nd, £5
No. 5 District— Hector Gon Chee, Killarney ..	18	145.1	64.0	10.3	5.5	79.8	3rd, £3

DISTRICT PRIZES.

DISTRICT No. 1.

A. G. Marks, Alberton ..	14½	113.9	50.2	10.6	9.0	89.8	1st, £5
L. S. Rachow, Alberton ..	13½	74.4	32.8	10.2	6.0	49.0	2nd, £2
W. O. Griffiths, Mount Forbes	15½	63.0	27.1	10.0	6.0	43.1	Divided 3rd Prize, £1
R. H. Morrison, Purga, <i>via</i> Ipswich	13	68.9	30.3	9.3	3.5	43.1	
E. Prenzler, Kulgun ..	16½	51.4	22.6	10.1	7.5	40.2	..
N. Kriedmann, Alberton ..	10½	63.9	28.1	9.8	2.0	39.9	..

DISTRICT No. 2.

A. H. Sims, Gheerulla, Eumundi	11½	169.6	48.4	11.0	8.0	67.4	1st, £5
Isabella Guldbransen, Samford	18	111.9	49.3	10.3	3.5	63.1	2nd, £2
A. H. Pickering, Gheerulla, Eumundi	14	105.6	46.5	11.0	4.0	61.5	3rd, £1
R. H. Pickering, Oakey Creek, Eumundi	14	98.2	43.3	10.2	5.0	58.5	..
S. A. McGinn, Oakey Creek, Eumundi	16	94.3	41.5	10.6	4.5	56.6	..
W. S. Bray, Lawnton ..	13½	78.4	34.5	11.6	3.5	49.6	..
W. Guldbransen, Samford ..	16½	80.1	35.3	9.8	3.5	48.6	..
J. S. Bray, Lawnton ..	15½	72.9	32.1	11.5	3.5	47.1	..
August Reek, Coominya ..	14½	74.3	32.7	10.5	3.0	46.2	..
Geo. Thorpe, Mount Pleasant	15	67.2	29.6	9.6	3.0	42.2	..

DISTRICT No. 3.

Geo. Jannusch, Haden ..	17½	123.0	54.2	10.5	5.5	70.2	1st, £5
H. Thies, Pinelands, Crow's Nest	14	120.4	53.1	10.5	6.0	69.6	2nd, £2
H. Morgenstein, Pinelands ..	15	119.5	52.7	11.0	4.5	68.2	3rd, £1
Hermann Jannusch, Haden ..	16½	110.4	48.7	10.6	5.0	64.3	..
L. Smallbone, Pinelands ..	17½	94.5	41.6	10.2	7.0	58.8	..
William Jannusch, Haden ..	13½	100.1	44.1	9.8	4.0	57.9	..
D. H. Bade, Ma Ma Creek ..	14	99.7	43.9	9.7	4.0	57.6	..

RESULTS OF THE COMPETITION—*continued.*SPECIAL PRIZES—*continued.*

Name and Address.	Age.	Yield per Acre in Bushels.	Points Awarded for Yield. Maxi- mum Points, 75.	Quality of Grain and Uniformity of Ear. Maxi- mum Points, 15.	Records. Field Data, 10 Points.	Total Maximum Points, 100.	District Prize.
DISTRICT NO 3— <i>continued.</i>							
E. F. Smallbone, Pinelands, Crow's Nest	13 $\frac{3}{4}$	96.3	42.4	10.3	4.5	57.2	..
C. Dow, Ma Ma Creek, Grantham	13	63.5	28.0	10.2	2.0	40.2	..
DISTRICT No. 4.							
E. V. E. Burton, Boobie ..	18	169.6	74.8	8.6	6.0	89.4	1st, £5
W. J. Maynard, Goodger, King- aroy	15	133.4	58.8	10.2	6.5	75.5	2nd, £2
S. L. Marshall, Wooroolin ..	14 $\frac{3}{4}$	111.3	49.1	10.7	7.0	66.8	3rd, £1
Eli W. Hayden, Boobie ..	..	99.9	44.0	10.2	6.0	60.2	..
Arthur Gray, Wooroolin ..	14 $\frac{3}{4}$	98.2	43.3	9.7	4.5	57.5	..
Helen Franklin, Coolabunia ..	18	90.3	39.8	11.1	3.0	53.9	..
J. F. Wyvill, Yarraman Creek	16 $\frac{1}{4}$	84.2	37.1	9.7	6.0	52.8	..
W. G. Wyvill, Yarraman Creek	13	77.2	34.0	10.2	6.0	50.2	..
G. H. Maynard, Goodger, King- aroy	14	81.3	35.8	10.0	4.0	49.8	..
R. E. Pickles, Coolabunia ..	14	73.6	32.4	10.2	4.0	46.6	..
Theo. Howell, Wondai ..	12 $\frac{3}{4}$	52.7	23.2	10.2	4.5	37.9	..
W. H. Simpson, Eden Vale, Kingaroy	13 $\frac{3}{4}$	54.2	23.9	9.5	3.0	36.4	..
J. L. Horne, Goomeri ..	16 $\frac{1}{4}$	43.5	19.1	9.6	4.0	32.7	..
DISTRICT No. 5.							
G. E. Gon Chee, Killarney ..	16	153.3	67.6	10.1	5.5	83.2	1st, £5
Hector Gon Chee, Killarney ..	18	145.1	64.0	10.3	5.5	79.8	2nd, £2
Willie Gon Chee, Killarney ..	13 $\frac{3}{4}$	135.9	59.9	10.3	3.0	73.2	3rd, £1
Isabella Wilkie, Killarney ..	13	105.5	46.5	11.1	7.0	64.6	..
T. C. Williams, Plainby ..	15 $\frac{1}{2}$	112.1	49.6	10.0	3.5	62.9	..
P. C. Arthur, Plainby ..	14	87.5	29.7	10.1	3.5	43.3	..
A. E. Masters, Goomburra ..	13	61.4	27.0	10.4	4.7	41.4	..
R. Harland, Plainby ..	9	66.9	29.5	9.8	2.0	41.3	..
J. J. Gallagher, Clifton ..	11 $\frac{3}{4}$	64.7	28.5	9.7	2.0	40.2	..
E. Ardron, Goomburra ..	14 $\frac{1}{2}$	57.8	25.5	10.2	2.0	37.7	..
DISTRICT No. 6.							
F. H. Lieberam, Gurgeena ..	17	104.4	46.0	11.3	4.5	61.8	1st, £5
E. E. Lieberam, Gurgeena ..	15 $\frac{1}{2}$	98.1	43.2	11.0	4.5	58.7	2nd, £2
J. D. Sandow, Binjour Plateau	15 $\frac{1}{2}$	69.1	30.4	9.8	2.5	42.7	3rd, £1
Fritz Eggerling, Mundowran ..	16	65.9	29.0	9.8	2.0	40.8	..
Chas. Eggerling, Mundowran	12 $\frac{3}{4}$	65.9	29.0	9.7	2.0	40.7	..
Richard Eggerling, Mundowran	11 $\frac{1}{2}$	64.9	28.6	9.8	2.0	40.4	..
A. Bjorndahl, Reid's Creek, Gayndah	14	40.0	17.6	10.1	2.0	29.7	..
DISTRICT No. 7.							
E. C. Hartland, Rosalie Plains	12 $\frac{3}{4}$	75.5	33.3	10.6	4.0	47.9	1st, £5
M. M. Steger, Evergreen, via Oakley	14 $\frac{1}{2}$	70.7	31.1	10.0	2.5	43.6	2nd, £2
A. J. Beitz, Roma ..	13	59.4	26.2	9.8	4.5	40.5	3rd, £1
W. York, Wallumbilla ..	14 $\frac{1}{2}$	41.1	18.1	10.0	5.5	33.6	..
G. E. Regan, Roma ..	16 $\frac{3}{4}$	33.2	14.6	9.4	4.5	28.5	..
P. Kiesecker, Roma ..	16 $\frac{1}{2}$	35.6	15.7	9.6	2.0	27.3	..
DISTRICT No. 8.							
Mary Wilson, Yeppoon ..	16 $\frac{1}{2}$	63.8	28.1	11.1	4.0	43.2	1st, £5
W. B. Philp, Mount Larcom ..	17	48.6	21.4	9.6	4.0	35.0	..
DISTRICT No. 9.							
H. C. Downs, Tarzali ..	12	129.7	57.2	9.6	4.0	70.8	1st, £5
K. E. Downs, Tarzali ..	13 $\frac{1}{2}$	100.8	44.4	9.6	3.5	57.5	2nd, £2
L. G. Downs, Tarzali ..	10 $\frac{1}{4}$	97.5	43.0	9.5	3.5	56.0	..
H. C. Mazlin, Atherton ..	7 $\frac{1}{2}$	55.7	24.5	10.4	3.0	37.9	..

The steady progress shown in the above results of the corn-growing competition affords ample evidence of their great value. Similar competitions have had a stimulating effect in the largest maize-producing country in the world—viz., the United States of America—and it is almost certain that they will have a similar beneficial result in Queensland. A writer in the Brisbane "Daily Mail" alluding to the Juvenile Corn-growing Competition, says:—

"In maize-growing, on account of it being so easily cross-fertilised, special attention must be given to the care of seed. The truth of this is shown by the experience in this State under the old system of experiments carried out by the school teachers, who often tested different varieties in a small plot, and consequently the seed became mixed. This result could only be expected. Much more valuable have been the boys' maize competitions, which have been so successful in Queensland and which should be encouraged in every way possible. Not only have splendid yields been obtained, in some cases phenomenal—as much as 135 bushels per acre being obtained, as compared with the average of the State of between 21 and 22 bushels—but the competitions have aroused keen interest amongst the older folks, and thus led to improved methods on the farms. Those who desire to encourage better methods of farming in as far as maize-growing is concerned in this State could not find a better means of doing so than by assisting these competitions. The success that has accompanied the Boys' Corn Clubs in the United States is famous, and the same lines should be followed here. Not only is the younger generation more plastic material to work than the older, already settled in the ways of a lifetime, but the education of the latter, bringing with it practical and inescapable results, have their effect upon all but the most hidebound of fathers, and gradually the methods learnt and proven by the boy's experience are adopted on his father's farm. The more young Queenslanders we have taking part in these maize-growing competitions, the higher will be the average yield of this crop in this State in ten years' time."

DISTRICT EXHIBITS.

A AND B GRADES.

The district exhibits in many items showed remarkable improvement over those of previous years. As Mr. John Reid, chief steward of the section, said at the distribution of the prizes, these exhibits were doing good work by increasing the number of men on the land, and also had the effect of drawing attention to Queensland land. They afforded educational advantages for the thousands of people who visited the Show. Special reference was made by Mr. Cadell to the Darling Downs exhibit, but all were the finest he had seen.

Before distributing the prizes, the chairman (Mr. John Macdonald) said that, according to schedule, if there were fewer than four competitors, the prize money totalled £250. The association, however, was satisfied, and would distribute £300 amongst the A Grade exhibitors. The prize money had been worked out on points, and had been allotted as follows:—A Grade: Darling Downs, £111 3s. 10d.; Wide Bay and Burnett, £99 8s. 7d.; Central Queensland, £89 7s. 7d.; total, £300. B Grade: Crow's Nest, £69 10s. 2d.; Gympie, £63 8s. 6d.; Wallumbilla, £61 11s. 10d.; Kingaroy, £54 14s. 7d.; Northern Downs, £50 14s. 11d.; total, £300. The Chairman then handed to the representatives cheques for the amounts stated, and also handed to the district fruit exhibit representatives cheques as follows:—Landsborough and Caboolture, £37 18s.; Palmwoods, £37 2s. To Mr. Nystrom he handed a cheque for £50.

Mr. R. S. Archer (president of the Rockhampton Agricultural Society) proposed the toast of the winners, and said it was no disgrace to Wide Bay and Burnett and Central Queensland to be beaten by the Darling Downs.

This year, the Northern Rivers (N.S.W.) were not represented, and it was suggested that an interstate competition be organised by the Royal Agricultural Society, Sydney, and the National Association, Brisbane, in conjunction. This would attract people from all over the Commonwealth.

ONE-FARM EXHIBIT.

Last year there were three competitors, Mr. O. C. Williams, of Crow's Nest, Mr. J. A. Nystrom, of Boole, Kingaroy, and Mr. Allan, of Gympie. In that year, as in the previous year, Mr. Williams was successful. On this occasion Mr. Nystrom was the only exhibitor. Judging by the variety and excellence of his display, he thoroughly understands how to make the most of the capabilities of his land, and any other competitors would have had a hard tussle to wrest the prize from him. The prize was very deservedly awarded to him.

In the course of an interview with the Press representatives, Mr. J. Bain, Secretary of the National Association, said that he regarded the whole Show as

having been an unqualified success, and his feelings of gratification were shared by the members of the Association's Council. To this we may add that Mr. Bain's share in the achieved success, has, as shown by previous exhibitions during his tenure of office, very largely contributed, owing to his tireless energy, forethought, and courtesy to exhibitors and to the public. He further said, speaking of the district and one-farm exhibits:—

“Only those intimately connected with the promotion of district and one-man-farm exhibits have the faintest conception of the colossal work which these exhibits entail upon a few individuals. Were this known, even to a minor degree, they would necessarily feel compelled to admire the splendid workers who have staged the displays which we have on view to-day. We are more than pleased to again welcome Central Queensland after an absence of several years, and trust that this visit will only be a forerunner of another one, where the experience gained at this Show will be of such a nature that they will be enabled to carry off the blue. Strong efforts will be made next year to go even further afield. We hope to receive an exhibit from the Atherton Tableland and Cairns districts. The promotion of these exhibits has already started, and the assurance has been given that Bowen will be represented next year.”

BUTTER AWARDS.

EXPORT CLASSES.

The competition in the thirty-days' class was very keen amongst the twenty-seven competitors, amongst whom were several interstate factories. The first prize was awarded to the North Coast Co-operative Dairy Co., Ltd., Murwillumbah, which obtained 94 points out of the possible 100. The Downs Co-operative Dairy Co., Ltd., Toowoomba, was a close second with 93½ points, while another New South Wales concern, Dungog Co-operative Butter Factory, Ltd., was third with 93 points. The other factories' points ranged from 91½ down to 84. In the six weeks' storage class, Dungog, New South Wales, Co-operative Butter Factory was first with 95 points, the Downs Co-operative Dairy Co., Ltd., Toowoomba, second with 94, and Wide Bay Co-operative Dairy Co., Ltd., Gympie factory, third, with 93½ points. There were twenty-six entries in this class—the North Coast Co-operative Dairy Co., Ltd., was not a competitor. The other factories' points ranged from 92½ down to 86. In the eight-weeks' storage class, Dungog Co-operative Butter Factory, Ltd., New South Wales, was again first with 95 points, and the Downs Co-operative Dairy Co., Ltd., Toowoomba, was for the third time placed second with 94 points. The Maleny Co-operative Dairy Co., Ltd., with 93½ points was third, and the Queensland Farmers' Co-operative Co., Ltd., Laidley factory, fourth with 92½.

ONE BOX, THIRTY DAYS' STORAGE.

	Flavour.	Texture.	Colour.	Salting.	Packing.	Total.
Possible points	65	20	7	4	4	100
North Coast Co-operative Dairy Co., Ltd., Murwillumbah	60	19½	6½	4	4	94
The Downs Co-operative Dairy Co., Ltd., Toowoomba	59½	19½	6½	4	4	93½
Dungog Co-operative Butter Factory, Ltd., Dungog, N.S.W.	58	20	7	4	4	93
Queensland Farmers' Co-operative Co., Ltd., Grantham	57½	19½	6½	4	4	91½
Queensland Farmers' Co-operative Co., Ltd., Booval	57	19½	6½	4	4	91
The Downs Co-operative Dairy Co., Ltd., Dalby	57½	18½	7	4	4	91
The Wide Bay Co-operative Dairy Co., Ltd., Gympie	57	19½	7	4	3½	91
Maryborough Co-operative Dairy Co., Ltd., Kingaroy	57	19	6½	4	4	90½
Queensland Farmers' Co-operative Co., Ltd., Boonah	57	19	6½	4	4	90½
North Coast Co-operative Dairy Co., Ltd., Tweed Heads	56½	19½	6½	4	4	90½

ONE BOX, THIRTY DAYS' STORAGE—*continued.*

	Flavour.	Texture.	Colour.	Saltineg.	Packing.	Total.
Possible Points	65	20	7	4	4	100
Queensland Farmers' Co-operative Co., Ltd., Laidley	56	19	7	4	4	90
North Coast Co-operative Dairy Co., Ltd., Uki, N.S.W.	56	19½	6½	4	4	96
Caboolture Co-operative Dairy Co., Ltd.	56	19	7	4	3½	89½
Gayndah Co-operative Dairy Co., Ltd.	56	19	6½	4	4	89½
Maleny Co-operative Dairy Co., Ltd.	56	19	6½	4	4	89½
The Warwick Butter and Dairy Co., Ltd., Allora	56	19	7	4	3½	89½
Singleton, N.S.W., Central Co-operative Dairy Co., Ltd.	56	18	6½	4	4	88½
MacLagan Co-operative Dairy Co.	54	19	7	4	4	88
The Warwick Butter and Dairy Co., Ltd., Texas	55½	19	6½	3	4	88
The Logan and Albert Co-operative, Beaudesert	55	18½	6½	4	3½	87½
Goombungee Co-operative Dairy Co., Ltd., Killarney Dairy Co., Ltd.	55	18	6	4	4	87
Kin Kin Co-operative Dairy Co., Ltd.	55	18	6	4	3½	86½
Maryborough Co-operative Dairy Co., Ltd., Mundubbera	54	19	6	4	3½	86½
Maryborough Co-operative Dairy Co., Ltd., Biggenden	54	19	6½	4	3½	86
Oakey District Co-operative Butter Co., Ltd., Dayboro	53	19	6	4	3½	85½
Terror's Creek and Samson Vale Dairy Co., Ltd., Dayboro	53	18	6	4	3½	84½
	53	18	6	3½	3½	84

ONE BOX, SIX WEEKS' STORAGE.

Dungog (N.S.W.) Co-operative Butter Factory, Ltd.	60	20	7	4	4	95
The Downs Co-operative Dairy Co., Ltd., Toowoomba	59½	19½	7	4	4	94
The Wide Bay Co-operative Dairy Co., Ltd., Gympie	59	20	7	4	3½	93½
The Downs Co-operative Dairy Co., Ltd., Clifton	58	19½	7	4	4	92½
The Warwick Butter and Dairying Co., Ltd., Allora	57½	20	7	4	4	92½
MacLagan Co-operative Dairy Co.	58	19½	7	4	3½	92
Singleton Central Co-operative Dairy Co., Ltd.	58	18½	6½	4	4	91
The Warwick Butter and Dairying Co., Ltd., Warwick	57	19½	6½	4	4	91
Gayndah Co-operative Dairy Co., Ltd.	57	19	6½	4	4	90½
Queensland Farmers' Co-operative Ltd., Laidley	57	18½	6½	4	4	90
Maleny Co-operative Dairy Co., Ltd.	56	19	7	4	4	90
The Downs Co-operative Dairy Co., Ltd., Dalby	57	19	6½	3½	4	90
Queensland Farmers' Co-operative, Ltd., Boonah	55	19½	6½	4	4	89
Kin Kin Co-operative Dairy Co., Ltd.	56	18½	6½	4	4	89
Maryborough Co-operative Dairy Co., Ltd., Kingaroy	55	19	6½	4	4	88½
The Warwick Butter and Dairying Co., Ltd., Texas	54	19½	7	4	4	88½
The Queensland Farmers' Co-operative Dairy Co., Ltd., Booval	55	19	6	4	4	88
Killarney Dairy Co., Ltd.	54	19	6½	4	4	87½

ONE BOX, SIX WEEKS' STORAGE—continued.

	Favour.	Texture.	Colour.	Saltng.	Packing.	Total.
Possible points	65	20	7	4	4	100
Queensland Farmers' Co-operative, Ltd., Grantham	54	19	6½	4	4	87½
Caboolture Co-operative Dairy Co., Ltd.	53	19½	6½	4	4	87
Maryborough Co-operative Dairy Co., Ltd., Mundubbera	55	18	6	4	3½	86½
The Logan and Albert Co-operative Dairy Co., Ltd., Beaudesert	53½	19	6	4	4	86½
Terror's Creek and Samson Vale Dairy Co., Ltd., Dayboro'	55	18	6	4	3½	86½
Maryborough Co-operative Dairy Co., Ltd., Biggenden	53	18½	6½	4	4	86
Goombungee Co-operative Dairy Co., Ltd.	54	18	6½	4	3½	86
Oakey District Co-operative District But- ter Co., Ltd.	53	18	6½	4	4	85½

ONE BOX, EIGHT WEEKS' STORAGE.

Dungog, N.S.W., Co-operative Butter Factory, Ltd.	60	20	7	4	4	95
The Downs Co-operative Dairy Co., Ltd., Toowoomba	59½	19½	7	4	4	94
Maleny Co-operative Dairy Co., Ltd. .. .	59	19½	7	4	4	93½
Queensland Farmers' Co-operative Co., Ltd., Laidley	58	19½	7	4	4	92½
MacLagan Co-operative Dairy Co., Ltd., Singleton, N.S.W., Central Co-operative Dairy Co., Ltd.	57½	19½	7	4	4	92
Gayndah Co-operative Dairy Co., Ltd.	57	19½	7	4	4	91½
Downs Co-operative Dairy Co., Ltd., Clifton	57	20	7	4	3½	91½
The Warwick Butter and Dairying Co., Ltd., Texas	57	20	7	4	3½	91½
Queensland Farmers' Co-operative, Ltd., Booval	57	19	7	4	4	91
Queensland Farmers' Co-operative, Ltd., Boonah	57	19	7	4	4	91
Maryborough Co-operative Dairy Co., Ltd., Kingaroy	56½	19	7	4	4	90½
Downs Co-operative Dairy Co., Ltd., Dalby	56½	19	7	4	4	90½
Goombungee Co-operative Dairy Co., Ltd.	56	19	7	4	4	90
Wide Bay Co-operative Dairy Co., Ltd., Gympie	56½	19½	6½	4	3	89½
Queensland Farmers' Co-operative Co., Ltd., Grantham	55	19	6½	4	4	88½
Caboolture Co-operative Dairy Co., Ltd.	54	19½	7	4	4	88½
Stanley River Co-operative Butter Co., Ltd., Woodford	56	18½	6	4	4	88½
The Warwick Butter and Dairying Co., Ltd., Allora	54	19	7	4	4	88
Oakey District Co-operative Butter Co., Ltd.	54	18½	6½	4	4	87
The Logan and Albert Co-operative Dairy Co., Ltd., Beaudesert	53	19	6½	4	4	86½
Kin Kin Co-operative Dairy Co., Ltd. .. .	55	18½	6	4	3	86½
Maryborough Co-operative Dairy Co., Ltd., Mundubbera	54	18	6	4	4	86
Terror's Creek and Samson Vale Dairy Co., Ltd., Dayboro	54	18	6	4	4	86
Warwick Butter and Dairying Co., Ltd., Warwick	53	18½	6	4	4	85½

ONE BOX FRESH FACTORY MADE, FOR LOCAL CONSUMPTION.

	Flavour.	Texture.	Colour.	Saltine.	Packing.	Total.
Possible Points	65	20	7	4	4	100
Queensland Farmers' Co-operative, Boonah	60	19½	7	4	4	94½
Logan and Albert, Beaudesert	60	19	7	4	4	94
Queensland Farmers' Co-operative, Booval	58½	19½	7	4	4	93
Wide Bay Co-operative, Gympie	59	19½	7	4	3½	93
North Coast Co-operative, Tweed Heads..	58	20	7	3½	4	92½
Queensland Farmers' Co-operative, Grantham	58	19	7	4	4	92
Maryborough Co-operative, Kingaroy ..	58	19½	6½	4	4	92
North Coast Co-operative, Uki	58	19½	6½	4	4	92
Caboolture Co-operative Co.	58½	19	7	4	3½	92
Dungog (N.S.W.) Co-operative	57	19½	7	4	4	91½
Goombungee Co-operative	57	19½	7	4	4	91½
MacLagan Co-operative	58½	19	6½	4	3½	91½
North Coast Co-operative, Murwillumbah	57½	19½	6	4	4	91
Queensland Farmers' Co-operative, Laidley	57	18½	7	4	4	90½
Downs Co-operative, Toowoomba	55	20	7	4	4	90
Warwick Co-operative, Warwick	56½	19½	6½	3½	4	90
Warwick Co-operative, Allora	56½	19½	6½	3½	4	90
Singleton Central Co-operative	56	19	6½	3½	4	89
Gayndah Co-operative	55	19	6½	4	4	88½
Maleny Co-operative	55	19	6½	4	4	88½
Oakey District Co-operative	54	19	6½	4	4	87½
Kin Kin Co-operative	54	19	6½	4	3½	87
Maryborough Co-operative, Mundubbera..	55	18	6	3½	3½	86

Special prize (trophy, value £10 10s.), presented by Messrs. Henry Berry and Co. Proprietary, Limited, for one box salt butter, 56 lb., salted with Australian salt.

Queensland Farmers' Co-operative, Boonah	60	19½	7	4	4	94½
Logan and Albert, Beaudesert	60	19	7	4	4	94
Warwick Co., Texas	59	19	7	4	4	93
Queensland Farmers' Co-operative, Booval	58½	19	7	4	4	92½
Queensland Farmers' Co-operative, Grantham	58½	19	7	4	4	92½
Wide Bay Co-operative, Gympie	58	19	7	4	4	92
Goombungee Co-operative	57	19½	7	4	4	91½
MacLagan Co-operative	57½	19½	7	4	3½	91½
Queensland Farmers' Co-operative, Laidley	57	19½	6½	4	4	91
Downs Co-operative, Dalby	57	19	7	4	4	91
Warwick Co., Warwick	56	20	7	4	4	91
Downs Co-operative, Toowoomba	55	20	7	4	4	90
Warwick Co., Allora	55	20	7	4	4	90
North Coast Co-operative, Uki	56	19½	6½	4	4	90
North Coast Co-operative, Tweed Heads..	55	20	7	4	4	90
Dungog (N.S.W.) Co-operative	55	19½	6½	4	4	89
North Coast Co-operative, Murwillumbah	55	19½	6½	4	4	89
Maleny Co-operative	54	19½	7	4	4	88½
Gayndah Dairy Co.	54	19	6	4	4	87
Kin Kin Co-operative	54	19	6½	4	3½	87
Singleton Co-operative	55	18½	6	3	4	86½

Special Prize (£5 5s.) presented by the Farmers' Co-operative Distributing Co. of Queensland, for the factory securing the greatest aggregate number of points in all classes, and special prizes for butter.

						Total.
Dungog (N.S.W.) Co-operative .. ..	..	..	..	..	..	463½
Downs Co-operative, Toowoomba .. ..	..	..	..	..	..	461½

CHEESE.

There was an exceptionally heavy exhibit in this section, which was divided into six classes, besides a trophy competition. The judge, Mr. M. Wallace, had thus an arduous task to perform. Our space will not admit of the publication of the details of the award, but the results as to prize-winners were as follow:—

Greenmount Dairy Co., Ltd., A factory and B factory, were placed first and second in the two export cheese, white, 70-80 lb. with 95 and 94½ points respectively out of a possible 100. For the two export cheese, 70-80 lb., coloured, the Pittsworth Dairy Co.'s Springside factory with 94½ points was first, and MacLagan Valley Co. Dairy Co.'s Kaimkillenbun factory second with 93½ points. For the two medium cheeses, not exceeding 40 lb. over 2 and under 3 months old, there was a close decision, the Southbrook Co-operative Dairy Co. being placed first with 94½ points, MacLagan Valley Co-operative Dairy Co., Kaimkillenbun, second with 94 points, and the Warwick Butter and Dairying Co.'s, Ltd., Victoria Hill factory, and the Pittsworth Dairy Co.'s Springside factory equal, third, with 93½ points, with Tummaville Co-operative Co., Ltd., 90 points, close fourth. In two medium cheeses not exceeding 40 lb., over six weeks and under two months' old, Irongate Co-operative Dairy Co., Ltd., was first with 94½ points, Ramsay Dairy Co., Ltd. (*via* Cambooya), second, with 94, and Goombungee Dairy Co., Ltd., third, with 93½ points. It will thus be seen that right through the four classes the winning competitors not only obtained high points, testifying to the excellence of the cheese, but there was in all remarkably close competition. Details are as follows:—

ADDITIONAL AWARDS.

The judging of the remaining classes of the cheese section was concluded by Mr. M. Wallace. In the class for two loaf cheeses not exceeding 12 lb., over two months and under three, the first prize was awarded to Southbrook Co-operative Dairy Co., Ltd., with 95 points out of a possible 100. The judge noted in his book that the winning exhibit was the best cheese he had seen. The second and third places were gained respectively by the Ramsay Dairy Co., Ltd., with 94 points, and Pittsworth Dairy Co.'s Yarranlea factory, with 93½ points. Some of the other factories were very close up. In the class for two loaf cheeses not exceeding six weeks and under two months' old, Tummaville Co-operative Dairy Co., Ltd., was first with 93½ points, and Goombungee Co-operative Dairy Co., Ltd., second with 93 points. For the trophy of cheese there were five entries, and the judge gave the blue ribbon to the Rosalie Cheese Factory, Glencoe, with 98 points. Greenmount Co-operative Dairy Co.'s butter factory was second with 95 points, and Southbrook Co-operative Dairy Co., Ltd., third, with 94 points.

Two Export Cheeses, 70-80 lb., to be not more than three weeks' old prior to storing, white suitable for English market. Exhibits to be placed in cold stores six weeks prior to 12th August. First prize, £5 5s., presented by Mr. C. E. McDougall, Lyndhurst, Warwick.

Two loaf cheeses not exceeding 12 lb., age over two months and under three months.

	Flavour.	Texture.	Colour.	Finish.	Total.
Possible points	50	25	15	10	100
Southbrook Co-operative	47	24½	14½	9	95
Ramsay Co.	46	24½	14	9½	94
Pittsworth Co., Yarranlea	45½	24½	14	9½	93½
Pittsworth Co., Pittsworth	45	23½	14	9½	92
Pittsworth Co., Springsure	44	23	14	9	90
Pittsworth Co., Scrubby	45	23½	14	9	91½
Dungog Co-operative	44	23½	13½	9	90
Irongate Co-operative	46	24	14	9	93
Mount Tyson Farmers'	43	23½	13½	9	89
Goombungee Co-operative	43	23½	14	9	89½
Southbrook Co-operative	45	23½	13½	9	91
Queensland Farmers' Co-operative, Rosevale	38	22	12½	8½	81
Greenmount A	45	22½	13½	8½	89½
Greenmount B	45	22½	13½	8½	89½
Gayndah Co-operative, Bynestown	44	23	12	8	88
Rosalie Cheese Factory	44	22½	12½	9½	88½

Two loaf cheeses not exceeding 12 lb., age over two months and under three months—*continued.*

	Flavour.	Texture.	Colour.	Finish.	Total.
Possible points	50	25	15	10	100
Rosalie Cheese Factory	44	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9 $\frac{1}{2}$	90 $\frac{1}{2}$
Warwick Co., Bony Mt.	44	23 $\frac{1}{2}$	13 $\frac{1}{2}$	8 $\frac{1}{2}$	89 $\frac{1}{2}$
Warwick Co., Victoria Hill	43	23	13 $\frac{1}{2}$	9	88 $\frac{1}{2}$
Warwick Co., Elbow Valley	45	24	13 $\frac{1}{2}$	8 $\frac{1}{2}$	91
Warwick Co., Talgai	43	23	13 $\frac{1}{2}$	9	88 $\frac{1}{2}$
Lauriston Co-operative	44	23 $\frac{1}{2}$	14	9 $\frac{1}{2}$	91
Biddeston Co-operative	42	23 $\frac{1}{2}$	14	9	88 $\frac{1}{2}$
Biddeston Co-operative	45	23	13 $\frac{1}{2}$	9	91
Downs Co-operative, Hodgson's Vale	44	23	13	9	89
Downs Co-operative, Koondai	44	23 $\frac{1}{2}$	13 $\frac{1}{2}$	8 $\frac{1}{2}$	89 $\frac{1}{2}$
Downs Co-operative, Westbrook	43	23	13	9	88
MacLagan Valley	45	23 $\frac{1}{2}$	13 $\frac{1}{2}$	8 $\frac{1}{2}$	90 $\frac{1}{2}$
Rock Creek	44	22 $\frac{1}{2}$	13	9	88 $\frac{1}{2}$
Tummalville Co-operative	45 $\frac{1}{2}$	24	13 $\frac{1}{2}$	9 $\frac{1}{2}$	92 $\frac{1}{2}$
Irongate Co-operative	46	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9	92
Rosalie Factory, Jondaryan	45 $\frac{1}{2}$	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9 $\frac{1}{2}$	92
Sugarloaf Co-operative	46	24	14	9	93

Two loaf cheeses, not exceeding 12 lb., over six weeks and under two months old.

Tummalville Co-operative	46	24	14	9 $\frac{1}{2}$	93 $\frac{1}{2}$
Goombungee Co-operative	46	24	14	9	93
Pittsworth Co.	44	23	13 $\frac{1}{2}$	8 $\frac{1}{2}$	89
Pittsworth Co., Yarranlea	42	22	13 $\frac{1}{2}$	8 $\frac{1}{2}$	86
Pittsworth Co., Springside	44	23 $\frac{1}{2}$	14	9	90 $\frac{1}{2}$
Pittsworth Co., Scrubby	45	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9	91
Pittsworth Co., Linthorpe	41	23	13 $\frac{1}{2}$	9	86 $\frac{1}{2}$
Dungog Co-operative	44	23	13 $\frac{1}{2}$	9	89 $\frac{1}{2}$
Irongate Co-operative	45	23	14	9	91
Mount Tyson Farmers'	44	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9	90
Ramsay Co.	45 $\frac{1}{2}$	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9	91 $\frac{1}{2}$
Standard Co., Wellcamp	41	22	12 $\frac{1}{2}$	8 $\frac{1}{2}$	84
Southbrook Co-operative	44	23	12 $\frac{1}{2}$	9	88 $\frac{1}{2}$
Queensland Farmers' Co-operative, Rosevale	38	21	13 $\frac{1}{2}$	8 $\frac{1}{2}$	80
Greenmount A Factory	44	23	13	8 $\frac{1}{2}$	88 $\frac{1}{2}$
Greenmount B Factory	45	23	13 $\frac{1}{2}$	9	90 $\frac{1}{2}$
Greenmount No. 1 Factory	44	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9	90
Gayndah Co-operative, Glen Eden	43	23 $\frac{1}{2}$	13 $\frac{1}{2}$	8 $\frac{1}{2}$	88 $\frac{1}{2}$
Gayndah Co-operative, Byrnestown	45	23 $\frac{1}{2}$	12 $\frac{1}{2}$	8 $\frac{1}{2}$	89 $\frac{1}{2}$
Rosalie Factory, Glencoe	44	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9 $\frac{1}{2}$	90 $\frac{1}{2}$
Rosalie Factory, Glencoe	44	23 $\frac{1}{2}$	13	9 $\frac{1}{2}$	90
Warwick Co., Bony Mt.	44	23 $\frac{1}{2}$	13	8 $\frac{1}{2}$	89
Warwick Co., Victoria Hill	44	23 $\frac{1}{2}$	13 $\frac{1}{2}$	8 $\frac{1}{2}$	89 $\frac{1}{2}$
Warwick Co., Elbow Valley	45	23 $\frac{1}{2}$	13 $\frac{1}{2}$	8 $\frac{1}{2}$	90 $\frac{1}{2}$
Warwick Co., Talgai	44 $\frac{1}{2}$	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9	90 $\frac{1}{2}$
Lauriston Co-operative	45	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9	91
Biddeston Co-operative	44	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9	90
Standard Co., Wellcamp	40	21	12	9	82
Downs Co-operative, Hodgson's Vale	45 $\frac{1}{2}$	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9 $\frac{1}{2}$	92
Downs Co-operative, Koondai	42	23 $\frac{1}{2}$	13	8 $\frac{1}{2}$	87
Downs Co-operative, Westbrook	43	23	13	8 $\frac{1}{2}$	87 $\frac{1}{2}$
MacLagan Co-operative, Kaimkillenbun	45	23 $\frac{1}{2}$	14	9	91 $\frac{1}{2}$
MacLagan Valley Co-operative	43	23	14	8 $\frac{1}{2}$	88 $\frac{1}{2}$
Rocky Creek Co.	43	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9	89
Rosalie Factory, Jondaryan	43	23 $\frac{1}{2}$	13 $\frac{1}{2}$	9	89
Sugarloaf Co-operative	45	24	13 $\frac{1}{2}$	9 $\frac{1}{2}$	92

TROPHY OF CHEESE.

Rosalie Cheese Factory, Glencoe	98
Greenmount Co-operative Dairy Co., Ltd., B Factory	95
Southbrook Dairy Co., Ltd., Southbrook	94

MILKING TESTS.

THE RESULTS.

Judges—Messrs. R. W. Winks and L. Anderson.

COW, 4 YEARS OLD AND OVER, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS.

	Weight of Milk.	C. Butter.	No. of Points for Butter, 24 hours.	Lactation Points.	Total Points.
1. Henry Benbow's Joyce	122.8	5.903	48.5	..	48.5
2. D. Dunn's Blossom III of Valley View	82.15	4.95	39.6	7.1	46.7
3. M. Laurence's Charmer II of City View	89.11	4.337	34.7	..	43.9
B. O'Connor's Shamrock of Hillview ..	125.5	4.159	33.25	..	33.25
B. O'Connor's Charm of Glenthorn ..	139.6	5.061	40.5	..	40.5
F. L. Nott's Tot of Booran	89.5	3.280	26.25	1.5	27.75
Nestle and A.S.C.M. Co.'s Maggie II, of Numba	101.2	4.313	34.5	..	34.5
Paul Moore's Lovely of Sunnyside ..	108.1	4.643	37.15	..	37.15
W. F. Hamel's Ginger	81	3.17	25.35	8.1	33.45
Marquardt Bros.' Champion	71.9	3.362	26.9	10	36.9
P. Biddle's Handsome of Home Park ..	70.8	3.001	24	..	24

COW, 4 YEARS AND OVER, AVERAGING GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS.

1. Henry Benbow's Joyce	122.8	5.903	..	..	..
2. B. O'Connor's Charm of Glenthorn ..	139.6	5.001	..	..	..
3. D. Dunn's Blossom III of Valley View	82.15	4.95	..	..	..
Marquardt Bros.' Champion	71.9	3.362	..	..	..
F. L. Nott's Tot of Booran	89.5	3.28	..	..	..
M. Laurence's Charmer II of City View ..	89.11	4.337	..	..	..
Nestle and A.S.C.M. Co.'s Maggie II of Numba	101.2	4.313	..	..	..
D. Dunn's Jemima II of Valley View ..	94.13	3.284	..	..	..
Paul Moore's Lovely of Sunnyside ..	108.1	4.643	..	..	..
W. F. Hamel's Ginger	81	3.17	..	..	..
C. Bloss's May	62.15	3.949	..	..	..
B. O'Connor's Shamrock of Hillview ..	125.5	4.159	..	..	..
Biddle's Handsome of Home Park ..	70.8	3.001	..	..	..

COW OR HEIFER, UNDER 4 YEARS, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FOR 48 HOURS.

1. E. Burton's Oxford Golden Girl ..	77.1	3.557	..	..	..
2. W. T. Savage's Ruby of White Park ..	96.12	3.472	..	..	..
3. W. Middleton's Cherry of Devon Court	60	2.83	..	..	..
B. O'Connor's Narrell of Oakvale ..	70.1	2.693	..	..	..
B. O'Connor's Mona of Oakvale ..	49.10	2.175	..	..	..
W. F. Hamel's Fancy	55.8	2.75	..	..	..

COW OR HEIFER, UNDER 4 YEARS, AVERAGING THE GREATEST DAILY YIELD OF BUTTER FAT FOR 48 HOURS.

1. E. Burton's Oxford Golden Girl ..	77.1	3.557	28.45	3.9	32.35
2. B. O'Connor's Mona of Oakvale ..	49.10	2.175	17.4	10	28.4
3. W. T. Savage's Ruby of White Park ..	96.12	3.472	27.75	..	27.75
W. Middleton's Cherry of Devon Court ..	60	2.83	22.65	..	22.65
R. O'Connor's Narrell of Oakvale ..	70.1	2.693	21.5	4.8	26.3
W. F. Hamel's Fancy	55.8	2.715	21.7	4.8	26.5

COWYIELDING THE LARGEST SUPPLY OF MILK IN 48 HOURS.

	Weight of Milk.	C. Butter.	No. of Points for Butter, 24 hours.	Lactation Points.	Total Points.
1. B. O'Connor's Charm of Glenthorne	36.12	32.1	38.11	31.14	139.6
2. Henry Benbow's Joyce	32.12	28.4	31.8	30	122.8
3. Paul Moore's Lovely of Sunnyside..	28.1	26.8	28.6	25.2	108.1
*B. O'Connor's Shamrock of Hillview	34.4	29.13	31.8	29.12	125.5
Nestle and A.S.C.M. Co.'s Maggie II. of Numba	28.8	24.13	25.3	22.10	101.2
D. Dunn's Jemima II of Valley View..	29.8	22.6	22.1	20.14	94.13
D. Dunn's Blossom III of Valley View	27.8	19	18.11	17.12	82.15
W. F. Hamel's Ginger	21.4	19	20.2	20	81

*Judge's note stated butter fat contents of milk below that prescribed in schedule.

National champion butter fat test (Brisbane Newspaper Company's, Ltd., trophy), for cow (any breeding) averaging the greatest yield of butter for 48 hours:—

Henry Benbow's Joyce. Weight of milk, 122.8; commercial butter, 5.903.

BACON, HAMS, AND LARD.

In both these classes there was good competition, and the exhibits were shown to great advantage. They were judged by Mr. G. S. Stening, Sydney, who pronounced them to be generally excellent in quality. Details of the result were as follows:—

HAMS.

	Flavour.	Texture.	Fat and Lean.	B'chering.	Smoking.	Colour.	Total.
Possible points	45	10	10	10	10	15	100
HAMS, 6, factory cured—							
J. C. Hutton, Brisbane	41½	9½	9½	9½	9½	14	93½
J. C. Hutton, Brisbane	42	9½	9	9½	9½	13½	93
Q'land Co-operative, Murarrie ..	40½	9½	9	9½	9½	14½	92½
Q'land Co-operative, Murarrie ..	40½	9½	9	9½	9½	14½	92½
Q'land Co-operative, Murarrie ..	40½	9	9½	9½	9½	14½	92½
J. C. Hutton, Melbourne	42	9½	9	9	9	13½	92
D. Downs, Willowburn	39	9	9	9½	9	14	90
D. Downs	38	9	8½	9½	9	14	88

BACON.

	45	10	10	10	10	15	100
Possible points	45	10	10	10	10	15	100
BACON, 6 sides, factory cured—							
Q'land Co-operative, Murarrie ..	41½	9½	9½	9½	9½	14½	94
Q'land Co-operative, Murarrie ..	42	9½	9	9½	9	14	93
J. C. Hutton, Brisbane	42½	9	9	9	9	14	82½
Queensland Co-operative	41½	9½	8½	9½	9½	14	92½
J. C. Hutton, Brisbane	42½	9	8½	9	9	14	92
J. C. Hutton, Melbourne	41½	9½	8½	8½	9	14	91
D. Downs, Willowburn	38½	8½	8½	9½	9½	14	88½
D. Downs, Willowburn	38½	8½	8½	9	9	14	87½

LARD.

LARD IN BLADDERS, 14 LB.

	Flavour.	Texture.	Colour.	Appearance.	Total.
Possible points	40	25	25	10	100
J. C. Hutton, Brisbane	37	25	25	9	96
Queensland Co-operative, Murarrie	36	24½	23½	9½	93½
Queensland Co-operative	36	24	23	9½	92½
Queensland Co-operative	35	24½	24	9	92½

SAUSAGE, SMOKED, 14 LB.

J. C. Hutton, Brisbane	1
Queensland Co-operative, Murarrie	2

SWINE AWARDS.

The cult of the pig is not the least important part of the dairy and general farmer's business. The most favoured animals of this class are, the Improved Berkshire, the Large Black, the Middle Yorkshire, the Essex, and the Tamworth. At one time, such breeds as the Prince Consorts, China-Poland, and other small blacks and whites were favoured, but of late years these latter have not been much in evidence, and have been conspicuous by their absence from urban and country shows. At this year's Show at Bowen Park, however, there were shown by an exhibitor from New South Wales three China-Poland sows of American origin. Of all breeds there were 141 entries. Details of the awards were as follows:—

For boars, Macfarlane Brothers secured champion, and Mr. W. J. Warburton's Northgate Queen was champion for sows. The same owner's Northgate Duchess was the champion of the Yorkshire breed, and Mr. D. W. Evans "scooped the pool" for Tamworths with his Knowles Queen.

The judge, Mr. H. M. Warburton, of Mittagong, New South Wales, said that the swine, generally speaking, were of excellent quality, and the numbers were considerably greater than in previous years. There was an all-round improvement on last year's exhibits, this being due, no doubt, to the increasing interest in this line. The Berkshires and Yorkshires were well to the fore, and there were some good specimens of the Tamworth breed, also Poland-China. It had been a very great pleasure to have before him such high-class animals.

DAIRY CATTLE.

Amongst the exhibitors of Ayrshires the first prize and the championship in the cow class was awarded to Jeannette III., the property of Mr. John Anderson, whilst Mr. J. H. Fairfax obtained second honours.

The Jerseys made a splendid display. An imported Jersey bull from Grasmere Jersey Stud, Merry Mike, took first honours in the aged class, and champion in his division. Larkspur, an imported cow exhibited by Messrs. W. and D. Carr, won first and championship.

In Holsteins (senior class for cow in milk) the first prize went to Mr. G. Neuman, of Wyreema, for his splendid cow Holly I. of St. Albans. In the senior bulls class Nestles's Farms took the first prize and the championship with Duke of Amsterdam.

In Guernseys the principal winner was Mr. G. H. Crowther.

The champion bull of the Illawarra breed was Diamond Boy of Blackland, owned by Mr. R. T. Ward. A typical milker, Charm of Glenthorne, carried off the championship for her owner, Mr. B. O'Connor.

The Herefords, in the opinion of good judges, could hardly be excelled in any part of the world. The prize for champion cow was carried off by Mr. James Sparkes, also Tindal, champion bull. The reserve champion in bulls went to Mrs. Lumley Hill, and the reserve in cows to Messrs. McConnell and Son.

Devons were few in number. Neither in North or South Devons was there any competition. Mr. J. T. Abbott carried off the prizes for the former, and Mr. T. A. Chirnside for the latter.

Aberdeen Angus were fairly represented and prizes were equally divided.

Only two exhibits of Sussex, a cow and a heifer, were present, both the property of Mr. Jas. T. Turner.

BEEF CATTLE.

The 1918 Brisbane Exhibition attracted a record in beef cattle, not only as regards numbers, but the improvement in quality was very marked; I do not think that a finer show of Shorthorns has ever been seen in Brisbane. The Lomas Pastoral Estates champion bull Grand Duke of Clifton was an exceptionally fine animal, very massive and full of quality, and would be hard to beat in any show ring in Australia. He competed here with some very fine specimens of the Shorthorn breed. The younger Shorthorns were generally very fine animals and bred from the best strains.

The Herefords, or ballys as they are commonly called, were a very strong and improved section this year, and there is no doubt that this breed is rapidly coming into favour. The champion Gunyan bull Magnitude was well named. He is an immense bull weighing over 1 ton 4 cwt., of great length and depth and remarkably well proportioned. There were many excellent cattle of this breed shown.

The Devons were a very fair lot.

The Aberdeen Polled Angus was well represented and there were a number of very fine cattle exhibited. Special mention might be made of Mr. J. A. McIntosh's first prize cow Annie Laurie, which is true to type and high class. This cow was bred by Mr. H. B. Williams, of New Zealand, who has sent quite a number of fine Angus cattle to Queensland.

The show sales of stud cattle were most interesting and instructive. There is no better judge than the buyer, and although prices were not quite so high or so uniform as last year, sellers of good quality cattle have every reason to be satisfied. Medium and plain cattle were rather hard to dispose of at sellers' values, but with a few exceptions they appeared to realise their market value.

Any cattle naturally immune or inoculated twice against tick fever were in good demand and easily sold. It seems that it would pay sellers to inoculate twice whenever possible before offering for sale.

Quite a number of stud cattle from the Southern States and New Zealand brought fair prices, although, by reason of the knocking about in transit, the majority of the animals were rather out of condition, and it behoves Southern breeders to get the condition hard on their stock before shipping if they wish to keep a bit of bloom on them for the sales. Some breeders were in the Brisbane market this year for the first time.

A new breed, South Devons, from Victoria, realised good prices. Young bulls brought up to 150 guineas and heifers to 131 guineas. These are great framed cattle, a little coarse in the bone, but there is plenty of frame to build the meat on. They were from imported stock and are said to be exceptionally heavy milkers and give a big return of butter. If so, these cattle should be the very thing to cross with our finer breeds to produce a dual purpose animal. It will be interesting to watch the result of crossing with this breed.

J. T.

COTTON INDUSTRY.

After many years of somnolence, the cotton industry shows abundant evidence of reviving, if one may judge by the relatively large quantity of cotton treated on farmers' account by the Department of Agriculture. Most of the agricultural sections at the Show made much use of cotton grown in many districts in decorating the pillars and trophies. This crop was a very paying one during the American Civil War, in 1870, and subsequently, when a cotton spinning mill was established at Ipswich. After a long lull, the Department of Agriculture elaborated a scheme which, it was hoped, would revive the industry, and also set up a cotton ginnery in

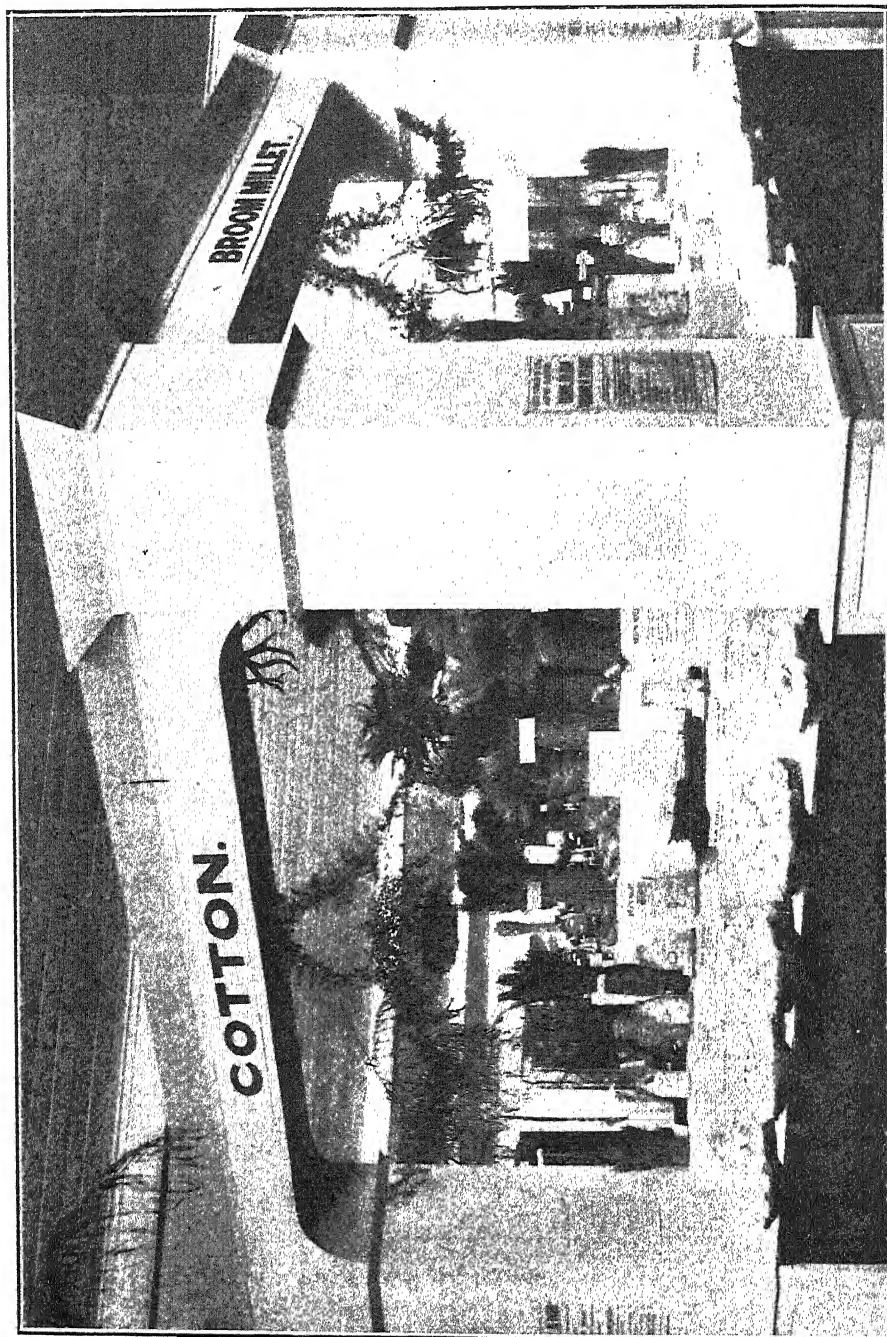


PLATE 23.—COTTON EXHIBIT.

Brisbane for the purpose of ginning all cotton consigned to the Department, which undertook to take, gin, and market all cotton sent to the departmental gin, making the growers an advance of 2d. per lb., supplying all seed gratis, and finally dividing all profits made by sale of the ginned cotton amongst the suppliers. Many farmers took advantage of this, and are so satisfied with the returns that far larger areas will be placed under cotton this spring.

HORTICULTURE.

The horticultural display at the Exhibition was well worthy of a visit; the excellent grouping and tasteful arrangement of the various beautifully variegated and scented flowers made an admirable and pleasing effect, interspersed with splendid ferns and other foliage plants. Mr. Bartels, as usual, had a beautiful exhibit of orchids, in the cultivation of which he is a pastmaster, and was the chief exhibitor, Mr. Jarrott being the only other exhibitor of these beautiful and, in many cases, enormously valuable plants. Mr. W. T. Bick's collection of palms was very striking. As for sweet peas, the exhibits all round were conspicuous for their size of bloom and beauty of colour. Messrs. Allan, Brewster, Barber, Phillips, and others exhibited magnificent blooms. Mr. Phillips took nine first prizes for his exhibit. Carnations, roses, and pansies were much in evidence, and gave evidence that flower-gardening has become a favourite hobby, if we may so call this delightful occupation, amongst a large number of city and suburban residents.

RECORD ATTENDANCE AT THE EXHIBITION.

On the fifth day of the Show, as a result of the unfavourable weather, the attendance and gate receipts showed a drop as compared with the corresponding day of last year, the takings being £935, as compared with £1,183 on the fifth day of the 1917 Show, a falling off of £248. The total for the five days this year was £7,005 as against £6,435 for the first five days of last year. The adult attendance on that day was estimated at about 15,000, and there were probably not less than 20,000 on the grounds during the day, or an approximate attendance of about 155,000 people for the five days of this year.

SALT FOR PIGS.

Last July, Mr. Thurlow, Inspector of Slaughter-houses, visited a piggery in the Enoggera district, and found that the pigs were suffering from some ailment. On inquiry and investigation he found that the owner had become possessed of a lot of damaged salt salmon which he intended and had used for feeding his pigs. It was at once seen that this salt food was the cause of the whole trouble, and, as salt is most dangerous to pigs, Mr. Thurlow strongly recommended the disuse of the salmon. Six of these pigs had died, and but for his fortunate visit, the owner would probably have lost the whole of his herd, amounting to some 300. Another pig-raiser in the district was about to purchase some of the damaged salmon, but fortunately heard in time of the above occurrence; hence, he did not buy and thus escaped a possibly severe loss.

CLOVER EIGHT FEET HIGH.

A unique crop of clover has been grown by Mr. A. Sommerlad, of Tenterfield, the results of which have justified the grower in his fifteen years of testing this variety. The clover, which is known as sweet or Bokhara clover (*Melilotus alba*), reached an average height of 8 ft., some portions of the crop being feet higher—a magic growth for clover. Mr. Sommerlad has about 50 acres of it in his cultivation paddocks, and cattle have grazed on it with the best results. It is quite safe to feed to dairy cattle, as they do not become blown on it. He has allowed about 10 acres to go to seed, which has been harvested for seed. It is a biennial plant, but if allowed to seed at the end of the second year it becomes permanent.—Exchange.

THE GROWING OF LUCERNE.

[CONTINUED FROM AUGUST JOURNAL.]

BROADCASTING LUCERNE.

The usual practice is to broadcast lucerne seed; and for the purpose the small hand broadcasting machines are to be recommended. In order to secure regularity of seeding, it is, of course, necessary to select a tolerably calm day for the purpose; moreover, the seed should be divided up into two even lots, each of which should be sown over the whole surface, but at right angles to the other. The seed should be broadcasted over a lightly-rolled surface, and subsequently rolled in, preferably with a ribbed roller. It is important to remember that lucerne seed should never be buried deeply; hence, if a harrow is used for covering purposes, only the very lightest of harrows should be resorted to. In my experience, a ribbed roller is infinitely superior for the purpose to any harrow.

QUANTITY OF SEED TO BE SOWN TO THE ACRE.

Opinions differ as to the quantity of lucerne seed that should be sown to the acre; some apparently favour light seeding, others heavy seeding. Personally, I am from conviction an advocate of relatively heavy seeding, chiefly because I am satisfied that heavy yields are very largely dependent on a dense stand of plants from the very outset. Hence, when broadcasting lucerne, I recommend a seeding of 20 lb. to the acre, 10 lb. sown in one direction, followed by 10 lb. sown at right angles to the first direction. This seeding will appear heavy to many. It should be recollected, however, that the best of lucerne-seed has not a value of much above 88 per cent., if we take into consideration impurities and defective grain. Moreover, when seed is broadcasted, a certain proportion is always lost from the depredations of insects, birds, &c. Briefly, so far as I am concerned, I have never found 20 lb. of seed to the acre too much. I must add, however, that many lucerne-growers recommend 12 lb. of seed to the acre as sufficient for all purposes.

DRILLING LUCERNE.

Broadcasting is not the only method of sowing lucerne in use; at times it is drilled. Drilling lucerne presents special advantages when the crop is not irrigated. The plants are then set out in rows sufficiently far apart to admit of regular summer tillage between cuts. The usual distance is 18 in. to 24 in. Naturally, drilling involves the use of far less seed than broadcasting; I believe that 8 lb. to 10 lb. of good seed to the acre should be amply sufficient.

When drilling lucerne-seed, special precautions should always be taken not to bury the seed too deeply; and with this object in view it is always advisable to drill over a rolled surface. The seed itself should be sown in mixture with bonedust at the rate of 1 cwt. to the acre.

GOOD SEED CHARACTERISTICS.

Lucerne-seed is at all times more or less costly; hence it behoves us to see that we are supplied with the best kind of seed procurable. Prior to the war, several types of lucerne-seed were usually on the market, among others Hunter River seed from New South Wales; Province seed, usually imported from France; various types of American seed; and, finally, seed of South Australian origin.

Of these different types, Hunter River seed was usually the most popular. Conditionally on the seed chosen being fresh, well-developed, and tolerably free from impurities, personally I do not think that there was ever much to choose between the different types. I must add, however, that in my own experience some seed of American origin appeared to give the best results from the point of view of total yields, at the Roseworthy Agricultural College. Unfortunately, when I approached the seedsmen who had supplied this seed with a repeat order they were unable to meet it.

At the present time we are thrown back on local supplies; and, so far as I know, providing the seed complies with the usual standards of quality I do not think that we have much to complain of. Good lucerne-seed should be haricot-bean-shaped, bright-yellow in colour, plump, and well developed. A small proportion of impurities is unavoidable in the best of samples; it should not, however, exceed 2 per cent. to 3 per cent. The seed should always be guaranteed free from dodder.

On a germination test, it is generally probable that not more than 90 per cent. of the lucerne-seed will germinate; and, allowing for impurities, this will give to ordinary good seed a cultural value of 87 per cent. to 88 per cent. Preference is sometimes expressed for two-year-old seed, on the ground that it germinates more regularly. Personally, however, whenever obtainable, I prefer seed of the preceding season.

FIRST-YEAR TREATMENT OF LUCERNE-FIELD.

If lucerne has been broadcasted in autumn, there is nothing that can be done to the field until the first growth is ready for cutting. If, on the other hand, the lucerne has been drilled in, it can, and should be, horse-hoed as soon as the rows of lucerne are sufficiently distinct for the purpose.

As has already been stated, in spite of careful fallowing, and all the more if fallowing has been neglected or omitted, weeds will spring up very freely in a recently-sown lucerne-field; and during the winter months these weeds will make stronger growth than the lucerne. I have known fields in which, by August, the lucerne, although well germinated, was barely visible. This condition of affairs is apt to frighten those who sow lucerne in autumn for the first time; I know of one grower to whom I had recommended the practice who proceeded to plough up the field rather than endeavour to control the weeds on the lines I shall indicate.

In spite of weeds, if in the early autumn the lucerne had germinated regularly, it will in the spring still be found there beneath the shelter of the weeds, and all that we need to do is to proceed to get rid of the weeds by using the mower freely and repeatedly. The first cut given in August will prove a very effective check to them; a second cut given in September will give the lucerne the start which it requires, and will enable it to smother out completely the weeds as the temperatures rise. It may be taken for granted that the third cut will be pure lucerne, without any weed admixture. Moreover, no summer weed has any chance of growth in a recently established lucerne-field.

If a recently sown lucerne-field is carefully handled and irrigated, five to seven cuts, including the two initial weedy ones, may be taken in the course of the first season; and each cut, if dried, will average within the neighbourhood of 1 ton to the acre. I must insist very strongly that whatever may be the practice adopted later on, on no account should a lucerne-field be grazed, however lightly, in the first winter of its development. This injunction applies not only to sheep, which are particularly dangerous, but also to larger forms of live-stock.

GENERAL TREATMENT OF LUCERNE-FIELD.

When the field enters upon the second year of its growth, the general treatment becomes normal. By this time the roots of the plant have become thoroughly well established, and the plants generally may be looked upon as being at the maximum of their productiveness. Among general cultural operations essential to success in lucerne-growing, we may dwell upon the following:—

SPRING DRESSING OF MANURE.

We must recollect, particularly when irrigation is practised, that the drain on the land by a lucerne crop is very considerable; hence, if we look to the continuance of high yields from year to year, we must be prepared to dress the field regularly in the opening spring months.

Lucerne, like most leguminous plants, benefits chiefly by dressings, both of phosphates and potash salts. Potash, however, is a very costly manure, nor, indeed, is it obtainable at the present time. On the other hand, in the great majority of our northern soils, at all events, potash appears to be very abundantly present; the only difficulty is that it is not always readily available to the roots of plants; for this purpose it has, as a rule, to be transformed into sulphate. This result can be secured; very readily and cheaply, by a suitable dressing of gypsum. Gypsum has the effect of mobilising the potash salts, and of enabling them to circulate freely and reach the deep roots of lucerne plants. Hence, in the spring months of the year, I recommend a dressing of 3 cwt. to 4 cwt. of gypsum to the acre, and about 2 cwt. of superphosphate.

Subsequently to this dressing the lucerne-field can, with great advantage, be run over with a spring-tine cultivator, in order to break through the surface crust and open up the soil. Little or no damage will be done to lucerne plants. The use of farmyard manure is sometimes recommended as a suitable top dressing for lucerne. Personally, I do not agree with this practice, providing always that a sufficient dressing of farmyard manure had been given prior to seeding.

GROWTH AND YIELDS OF LUCERNE.

The growth and yield of lucerne vary much with circumstances, the chief of which are probably temperature and an adequate water supply. Taking the latter for granted, the greater the heat the more rapid the growth of lucerne and the heavier its total yearly yield. Between August and April, under exceptionally favourable conditions of soil, temperature, and water, as much as 10 to 11 cuts of

lucerne have been secured, at intervals of three to four weeks' time. Under average conditions, however, five to six cuts, at intervals of five to seven weeks, are more usual.

Green lucerne loses about 75 per cent. of its weight on drying; and we may reckon that each well-grown cut of lucerne will correspond to about 1 ton of hay. As a rule, irrigation waters should be applied immediately after a cut; but in many circumstances, a second watering given between two cuts will lead to appreciably higher results. Needless to add that irrigation water must be tolerably free from saline matter; probably not more than 100 grains of total salt to the gallon is safe, even in very well-drained land.

When lucerne is subject to irrigation, total yields are, of course, very much lighter, and depend, even when the water table is within easy reach, almost exclusively on summer rainfall. Personally, I am of the opinion that unirrigated lucerne should always be drilled in rows, and tilled regularly after each cut. In these circumstances three to four cuts in one season may often be secured.

BEST TIME TO CUT LUCERNE.

The usual recommendation is that lucerne should be cut when about one-half of the field is in bloom. It is, perhaps, true that at this stage lucerne is better relished by livestock as yet unaccustomed to it. It is highly questionable, however, whether at this stage, lucerne has the best possible feeding value; in my opinion it is apt to be too hard and fibrous. Personally, I prefer cutting the crop just as the first flowers begin to appear.

Lucerne, as is well known, may be fed in the green state, which, perhaps, is the most economical way of handling it. It involves, however, bringing out every morning the mower for the day's requirements. Livestock new to lucerne do not always take to it readily at first in the green state, and it is generally advantageous to allow it to wilt slightly before offering it to them.

If all lucerne available cannot conveniently be handled in the green state, it can be converted into hay. Or, again, this practice may be adopted as a general rule. The making of hay offers no particular difficulties; in the warmer months of the year it is fit to be shifted in a couple of days. The chief difficulty to be avoided is a tendency to brittleness in the hay, and, as a result, a loss of leaf when carelessly handled; hence, when the weather is warm, it is usually safer to handle lucerne hay in the cooler hours of the morning.

GRAZING LUCERNE.

There is not the slightest doubt that if we have in view the highest possible total yields and length of life, that it is inadvisable to graze a lucerne-field at any time; in other words, grazing both reduces the apparent productiveness of a lucerne-field and its life. Nevertheless, we are bound to admit that grazing lucerne during the winter months of the year frequently offers high economic advantages, which, it may be, make ample compensation for its disadvantages. I, for one, confess that whenever possible during the winter months, I have always turned a lambing flock into a lucerne-field more than twelve months old; and it is a practice which I recommend to others. It goes without saying that when this practice is followed the field calls for careful watching; at no time should it be allowed to get too bare, and whenever the surface becomes too wet the flock should be temporarily removed.

HOW LONG SHOULD A LUCERNE-FIELD HOLD OUT?

There are some who appear to entertain the belief that a lucerne-field, once sown, should continue productive almost indefinitely, and who attribute to carelessness or neglect any tendency to falling away on the part of the field. Undoubtedly care and attention will, within certain limits, lengthen the period of profitable productiveness of a lucerne-field; nevertheless, Nature has set certain limits beyond which we cannot go. It is true, perhaps, that individual lucerne plants appear to persist for an almost indefinite number of years, but it would be rash to assume that the sum-total of individual plants which constitute the lucerne-field will be able to do the same. As a matter of fact, if the field is to be reasonably productive, individual plants are far too crowded to be able to occupy the same land for any length of time; from year to year individual plants will gradually die out throughout the field, which becomes correspondingly thinner and thinner, with corresponding yields lighter and lighter, until, if we take the cost of irrigation into consideration, the field no longer pays for handling. Eventually, as is often the case in the opening stages of growth, the sparsely clad field may carry more weed growth than lucerne.

The average lucerne-field may be taken to be at its best in the second year of growth; and thereafter it slowly declines. There are some fields, particularly if over-grazed, that are not worth irrigating after their fifth year; and there are very few

that are worth irrigating after their tenth year. Hence, when laying out land for irrigation purposes, it is as well to have within reach a sufficient area to bring in alternate periods, under lucerne at one time and under some other type of crop at another time. When the lucerne-field is played out, or when it no longer pays to waste water on it, it should be ploughed up and either grazed or brought under some other type of crop for a number of years. In the meantime, a new area of land could be placed under lucerne.

It is very unwise to sow lucerne a second time on old lucerne land at too short an interval between two crops. No less than four to five years should intervene between two lucerne crops. In the intervening years irrigated crops, such as maize or sorghum, can be grown, or ordinary winter crops, such as any one of the cereals.

LUCERNE AS A PURELY GRAZING CROP IN RELATIVELY DRY AREAS.

Hitherto I have dealt with what might be called the orthodox methods of handling lucerne; but, as farmers, even in relatively dry districts, we can often put it to other important uses. We can, with great advantage to ourselves, treat it as a purely grazing crop. In this connection, I shall describe a practice which I successfully followed for several years at Roseworthy.

Every season I used to sow about 20 acres of lucerne in an ordinary cereal hay crop. The hay crop was first drilled in, in the ordinary way; we then broadcasted lucerne over the selected area at the rate of 6 lb. to 8 lb. to the acre, and the seed was subsequently lightly rolled in. When sown in this fashion, the lucerne plants grow up in the shelter of the hay crop, and make a very fair showing by hay harvest time. Occasional failures are, it is true, unavoidable; but, if due care be taken, general conclusion is, that lucerne should not be grazed too soon after the removal of the hay crop; time should be given to it to harden and to get a firm hold of the ground. Generally speaking, the first grazing should not take place before April. In the years that follow, the lucerne can, of course, be grazed whenever it is found convenient to do so. In this connection, grazing lucerne laid down in this way will be found exceptionally useful in relatively wet summers, in which the dry feed is more or less spoilt. Naturally, in summers such as these, the growth of the lucerne is above the average. Personally, I generally endeavoured to reserve these lucerne-fields for the autumn grazing of lambing flocks.

The constant grazing to which these fields are subject, tends to shorten considerably the life of the plants. Generally speaking, grazing lucerne-fields should be broken up and brought back into the ordinary cropping rotation in their third or fourth year; hence, if you make it a practice to put down 20 acres under lucerne every year, you will usually have from 60 acres to 80 acres of lucerne at your disposal for grazing purposes, and this will represent an exceedingly valuable farming asset in any district.

FLAX AND LINSEED.

For many years unsuccessful attempts were made to establish the flax-growing industry in Victoria. It had been boomed and bonused, and experimented with, only to prove time and again that, on old-world lines of practice, which involved costly and laborious methods, it was unsuited to our Australian conditions of agriculture, and had to give place to more remunerative crops, just as happened to the cotton-growing industry in Queensland in the seventies, at the close of the Franco-Prussian war. But in both cases, time and the perseverance of certain believers in the ultimate successful establishment of these industries overcame all difficulties. It had always been held and practised, and adopted in the early experiments in Victoria, that a crop of good fibre and seed could not be obtained from the same field; that, in order to get good fibre, the crop had to be harvested when in blossom, before the seed had ripened, and, above all, that it had to be hand-pulled—a very costly and laborious process. Eventually, however, three young settlers, the Wolff Brothers, of Traralgon, proved that both seed and fibre can be obtained from the same crop, after the seed had thoroughly ripened, and that so unnecessary is hand-pulling, that fibre which will command the top price when submitted to expert dealers in flax and other fibres is produced when the reaper and binder is turned into the flax fields, cutting down the crop at the rate of 10 or 12 acres a day. The old process of pit-retting (that is, steeping the straw for several weeks in pits of water) has been discarded, and the much more simple one substituted of spreading it out on the grass in the autumn, to let the dew and rain do the work, and instead of ripping out the seed, two wooden rollers are employed, one above the other, and between these two men can feed the sheaf-heads without untying the binder knot, and thresh out the seed perfectly, at the rate of over two acres a day.

RETURNS PER ACRE.

So far back as 1903, the pioneers of the industry, Messrs. Wolff Bros., had 120 acres under flax. Their gross returns from this area in seed and fibre amounted to £2,000, or at the rate of £16 16s. per acre. After paying away in rent, cost of cultivation, and all the processes of harvesting, threshing, and fibre manufacture, over £8 per acre, they realised the handsome net profit of £8 10s. per acre. Samples of the dew-retted flax were sent to some of the largest flax buyers in Europe, and an offer was received from a Belgian firm of £45 per ton, delivered in Melbourne. The prices obtained from local Melbourne buyers ranged from £40 to £45 per ton.

The average return of seed was 14 bushels per acre, which sold readily in pre-war days at £14 per ton, for linseed oil making, working out at 7s. 6d. per bushel, which, together with the flax, gives a gross return of £16 16s. per acre, the net return being £8 10s. per acre.

TIME TO SOW.

Spring sowing, as in Europe, is found to be a mistake in Australia. The time to sow here is in May. If sown broadcast the quantity of seed required per acre is 1½ bushels. Of two varieties, the White Belgian and the Riga, the latter is to be preferred. It gives a greater quantity of fibre and seed per acre, and if got in early there is no fear of any worm attacking the seed pods.

METHODS OF CUTTING AND THRESHING.

In cutting with the binder, the knives must be kept sharp—sharp as razors. This enables the work to be done at the rate of 10 or 12 acres per day, the sheaves being beautifully even, and not at all tangled. There is much less loss of seed by shaking out than is the case with many other cereal crops. After standing in the stocks in the paddock for about a fortnight it can be either threshed, and the straw stacked, or stacked as it is, and threshed at leisure. A primitive and cheap method of speedy threshing without injury to the seed may be thus described:—

Two wooden rollers, each two feet in diameter, set one above the other, on spindles. The spindle of the upper one works in slot-holes with a perpendicular play of about two inches, and to the spindle of the lower one is attached a wooden pulley, on which is placed a belt from a five-horse-power oil engine which drives the “breaker,” and the “scutcher.” It is driven at the rate of 140 revolutions per minute. One man feeds in the sheaves without untying them, and another man or boy takes them away. The seed, being all threshed out, is then cleaned ready for market by being put through an ordinary grain winnower. Two men, with this machine, can thresh out the crop at the rate of from two to three acres per day. Previous to the war, 6d. per bushel was paid for threshing (by contract), and 2d. per bushel for cleaning. One bushel weighs 56 lb. Rates of wages since the war are higher, but so also is the price of flax and linseed.

MANUFACTURING THE FIBRE.

The method of preparing the fibre is equally simple. The crop remains in the stack till March. It is then carted out and spread on the grass land. One acre of grass land provides room for two acres of the crop. The bundles, after the seed has been removed, are untied, and spread out evenly in a thin layer on the ground, and if there have been good rains or heavy dew, the straw is ready for turning in about a fortnight. The turning over is quickly done with a long pole.

After turning, the straw is left out for another fortnight or three weeks. Then it is gathered up loose in thin round stooks to dry for two or three days; then tied into handy bundles, carted and re-stacked close to the shed where the flax is manufactured. All this latter work must be done in dry weather.

THE COST OF THE MACHINERY

is not heavy even in these war times. The “breaker” costs about £35, the “scutcher” £40, and both are driven by the same oil-engine.

It should have been stated that the breaker (£35) consists of four fluted iron rollers in two sets, which turn half round and back. The straw is passed between the two sets, which break out the woody material in the stems and leave the fibre with a lot of woody particles adhering to it. Then the scutcher, which is simply a set of wooden blades revolving rapidly behind an iron shield, cleans them off and leaves the fibre fit for market. The fibre, when quite dry, is put up in 14-lb. bundles and then packed in wool bales holding about 5 cwt.

UNLIMITED MARKETS.

The value of imports of linseed into Great Britain amounts to between £1,000,000 and £5,000,000 annually; linseed cake for cattle-feeding to £1,500,000;

and flax to over £2,500,000. In 1913-14, just before the war, the gross linseed imports into the United Kingdom for the twelve months were 3,274,000 quarters, and the total American imports of linseed for 1914, 1915, and 1916 respectively, were 231,163 tons, 370,909 tons, and 327,451 tons. A market is also assured in New South Wales, one firm in the linseed oil trade (Messrs. Meggitt, Ltd., Sydney) guarantee a market for at least 10,000 tons annually, at prices ranging from 6s. to 10s. per bushel in the near future. As shown above, an average net profit per acre, based on a yield of 14 bushels per acre, should amount to £8 10s.. To this must be added the value of the flax, which in the British markets is to-day worth over double the pre-war prices. The price of linseed in the London commercial reports is quoted as from £28 to £30 per ton, or up to 14s. per bushel. Mr. D. MacPherson, when manager of Biggenden State Farm, 50 miles from Maryborough, wrote as follows on experiments made at the farm in 1910 in flax-growing:—

“Recent developments in the methods of harvesting and treating the fibre and seed of the flax plant make it probable that this crop will be found to be a distinctly paying one for Queensland. As the seed may be drilled or broadcasted, and the crop cut with a binder, it follows that these operations need not run into greater expense than they do for wheat, while the cash returns should be greater, as both seed and straw are of value.

“In the ‘Victorian Agricultural Journal,’ May, 1906, the price of flax seed or linseed is given as 8s. per bushel, and the same journal estimates the value of the fibre from 1 acre at £11 5s., and the cost of dew retting at 15s. per acre, and manufacturing £3 10s. Dew retting is, however, not always practicable here, as in some seasons there is practically no dew.* This trouble is, however, likely to be soon overcome; and, if not already so, it soon will be possible to market the flax straw unretted.

“From experiments carried out at this farm during the past three years, I am convinced that anyone having the necessary implements for handling wheat could also grow flax; and, so long as the market value of linseed did not go below that of wheat, would receive a better return per acre, even if the seed only were marketed, owing to the more certain yield from the flax.

“Then, if we take into consideration the value of the fibre, and this is really the main product of the plant, and estimated in the Victorian Journal to be worth over £11 per acre, it must be admitted that there is every probability of the crop being a paying one. Another consideration, and one that should have considerable weight with us, is that the crop is less dependent on climatic conditions than any of the cereals.

“Should the season be a wet one, it is probable that the crop of seed will ripen unevenly, and in this way a proportion of seed may be lost; but, even so, the yield of seed will still be a creditable one, and the crop of fibre will be extra heavy.

“If, on the other hand, it strikes dry weather, neither the seed nor the fibre will be any the worse for eight or ten weeks of comparative dry weather before cutting.

“Again, flax likes a warm free soil, and, as the soil on this farm is very stiff and heavy, it is more than likely that the results obtained here may be improved upon.

“I give the results from an experimental plot planted here on the 3rd April, and cut on the 30th September. Also, the rainfall for the months between planting and harvesting. It may be mentioned that the seed did not germinate till after the rains that fell in the last week of May, so that the crop takes only four months from germination to harvest.

“The plot sown contained 3 perches. A portion of this was cut before the seed was properly ripe for fibre samples, &c.

“From the remainder (exactly 64 sq. yds.), 23 lb. of clean plump seed and 47 lb. of threshed straw was obtained, or at the rate of 27 bushels (60 lb. per bushel) of seed, and 31 cwt. 3 qr. of straw, to the acre.

“I have, so far, been unable to get the fibre content of the straw.

“Rainfall—April, .34; May, 4.02; June, 5.24; July, 1.55; August, .96; September, .27.

“I have grown flax here for the three past seasons, and the crop has every time given satisfactory results.

“The last two seasons the large-seeded Russian variety was grown, and the season before that the Riga.”

*In Germany and Switzerland, we have seen the flax spread out on the grass, and watered from watering-cans. Dew is not an absolute necessary for dew-retting.—Ed., “Q.A.J.”

MARKET GARDENING.

EXPERIMENTS IN CONNECTION WITH THE DESTRUCTION OF INSECT PESTS OF THE TOMATO.

In May, 1917, the Director of Fruit Culture, Mr. A. H. Benson, with the view of assisting tomato-growers to prevent the serious losses of these crops due to the ravages of the tomato moth, by destroying the larvæ, made arrangements for a series of experiments to test the efficacy of certain sprays and various forms of lantern traps at Wynnum. The results were published in the February (1918) issue of the Journal, since when numerous inquiries are frequently being received (presumably from non-subscribers to the Journal) by the department, respecting the best method of preventing the ravages of tomato moths. It is, therefore, thought advisable to reprint, with useful additions, the article of February last, as follows:—

The experiments were carried out on two plots, one owned by Mr. H. Randall, Wynnum West, and the other by Messrs. Hargreaves and Sons, Manly. They were initiated to ascertain the most effective means of combating the grubs or larvæ which destroy a large proportion of the tomato crop almost every year.

There were two main objectives—

1. To find the most effective means of destroying the eggs and larvæ on the plants;
2. To find the best means of trapping the moths.

The following insecticides were used:—*Arsenate of Lead* (Sherwin-Williams Brand).—This was mixed with water at the rate of $\frac{1}{2}$ lb. to 16 gallons (about four kerosene tins). The $\frac{1}{2}$ lb. arsenate was first made into a thin cream by adding a little water gradually and afterwards adding the remainder of the water. This quantity, 16 gallons, could be applied by an autospray pump, worked by one man, in about 2½ hours, and was found sufficient to treat one-quarter of an acre of tomato plants. Between 3.30 p.m. and dusk was found the best time of the day for spraying. The mixture must be kept in motion whilst being applied.

Paris Green and Lime.—One pound Paris green to 6 lb. finely sifted slacked lime. This was well mixed, and it was found that it should be applied on a calm day by means of a sulphuring machine or by tying the mixture in a small bag or piece of bagging and shaking or beating it over the plants. This quantity was found sufficient for one-quarter acre; the quantity to be applied would depend largely on the size of the plants and the calmness of the weather.

Two applications of each of the insecticides were made—first, when the first lot of flowers had withered, and the second about four weeks later; but it was found that three, or even four, applications would be beneficial at intervals of about three weeks.

The arsenate of lead showed slightly better results than the Paris green and lime.

Various lights were tried for trapping moths at night as follows:—

1. Bicycle carbide lamp with trays specially arranged. This proved unsatisfactory, and was abandoned early in the experiments.

2. Ordinary naked carbide lamps with kerosened trays underneath.
3. Ordinary hurricane lamps (kerosene), also with kerosened trays underneath.

The common hurricane lantern was found the most satisfactory light for the purpose. Details as to construction of trays and setting up lanterns are given and illustrated in the February issue of the Journal, page 67. The lantern was so arranged that the moths would rebound from the glass globe into the kerosene-covered water in the tray. About half an inch depth of water under a thin layer or film of kerosene was found sufficient for destroying the moths in the tray.

STAGING VEGETABLES FOR SHOW.

Somewhere about the year 1910 (says "South African Gardening," June, 1918), vegetable growing and showing had been raised to such a pitch of excellence in the British Isles, that a vegetable society was formed which holds its show every year in London. This is held in the autumn (corresponding to our spring in Queensland—Ed.). There are classes for 12, 9, or 6 kinds selected from a given list. Classes for a definite number of salads, 9-6, or any the committee select. Potatoes, onions, and many other vegetables are also shown in separate classes.

Presuming an intending exhibitor is going to put up a collection of, say, nine distinct kinds, he may perhaps select cauliflower, pea, onion, parsnip, carrot, turnip, celery, beet, cress.

The Cauliflowers, three or six (the schedule generally says how many of each may be shown), are chosen for their whiteness, closeness of curd, freedom from blemish of any kind, and uniformity of size. The leaves are carefully trimmed away, exposing the curd. They are generally arranged in a pyramid in the centre or at the back; perhaps two pyramids can be made. They must all be the same variety. Cut cauliflowers in the early morning.

Pea.—Large, fully formed pods, free from blemish. These must be cut from the plant and held by their stalks in order not to damage the bloom on them. They should not be washed therefore. These are sometimes laid out in straight rows or forming a pattern round some other exhibit. In some cases they are piled neatly on a bed of parsley or in a chip basket, or fastened thickly to a cone of wire completely covering it. Some people grow the plants in tins, and bring the whole thing, training the peas up the back of the stage, while others arrange them on black velvet pads.

Onion.—Large, solid, good shape. Carefully washed with a soft sponge. The dry top is cut and doubled down and fastened neatly at the neck. The roots are trimmed off close unless "spring onions" are shown, when the long white roots are left, instead of fully matured ones. They must be the same variety, size, and shape. Sometimes arranged in a pile, in a dish or basket, in straight lines or triangles or bedding in parsley to show up the colour.

Parsnip.—Long, straight, perfectly shaped roots. Same in size and height and thickness. Some are shown three or four feet long, but

shorter roots are quite as effective and more useful. Dig without damaging or breaking the roots, wash with a soft sponge. Trim off the tops to within a couple of inches of the crown. Staged in pairs or triplets in baskets or on the table; sometimes stacked like corn-sheaves in a stook.

Carrot.—The same points must be observed in showing these. Undamaged, straight, even roots, graded to size, carefully washed—not scrubbed. Staged in baskets in rows or piles, the number shown according to schedule as in all cases. Stump-rooted must not be shown in the same pile as long ones. Two varieties cannot be shown unless it is so stated.

Turnip is effective as a show vegetable, showing up well against the orange colour of the carrot and the green of the pea pod. The root is washed and the tops trimmed away, but the root is left intact. Pile them with the root outwards, all the tops being hidden.

Celery.—A limited number of sticks of even size perfectly blanched. These want careful washing to get all the soil from between the stalks. The root is trimmed off, leaving a short point as in a pencil. Some people leave the green top intact; others trim it away down to the blanched portion.

Beet.—Long-rooted beet should be straight, thick, unbranched, and a good deep colour. Trim away the little fine roots and the tops, leaving the tiny centre leaves if you choose. Flat or round beet must not have the root removed, but, like the long beet, must be carefully washed. Often piled as for turnips in the case of the round beet or arranged in rows for the long ones, which, of course, must be all the same in length and thickness and colour.

Cress.—Often shown with mustard, but is shown separately too. Can be grown in the round or square chip basket, in which it is shown. If not it is cut and placed in the basket as though it were growing. It is very pretty grown on a cone of clay covered with fine wire. The seed is thrown on the wet shape, and if successfully done makes a perfect mass of fresh young green.

Potatoes.—Dig very carefully so as not to injure the tubers. Use a soft sponge and be careful not to break the skin. Tubers must be free from blemish; size, shape, and colour, not necessarily the biggest, which are often lacking in flavour. The bench itself should be covered, for choice, with a white covering, as it shows up the groups well. Parsley garnishing helps to set them off sometimes. Do not overcrowd—leave some space between so that each exhibit can be shown to its best advantage. Very often a few foliage plants are allowed, but on the whole they are better away unless used with great care and judgment. Group the colours harmoniously, and keep the whole evenly balanced.

Aim for one central feature, and work up to that. Perhaps the best specimen is onion; then give that prominence. In the photograph in the May number of the exhibit from Potchefstroom the pile of Keiffer pears quite dwarfed the apples, and even the pumpkin looked insignificant. Aim for quality, not for huge ungainly roots. I have not said half what I would wish on behalf of the vegetables and their place on the show bench, but Mr. Editor's blue pencil is large and thick. Perhaps at some future date he will give me an opportunity to plead for some other kinds of less known vegetables.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Book Societies is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
 The Shorthorn Herd Book of Queensland;
 The Jersey Herd Book of Queensland;
 The Illawarra Herd Book of Queensland;
 The Ayrshire Herd Book of Queensland;
 The Milking Shorthorn Herd Book of Queensland;
 The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS.				
AYRSHIRES.				
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	40	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview," Southbrook	7	34	Do.
JERSEYS.				
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoorra	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, <i>via</i> Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.

DAIRY BREEDS—*continued.*

GUERNSEYS.

Queensland Agricultural College	Gatton	2	2	Eligible, but no Guernsey Herd Book of Australia
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HOLSTEINS.

Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman	.. "St. Athan," Wyreema	12	47	Do.
F. G. C. Gratton	.. "Fowlerton," Kingsthorpe	1	15	Do.
R. S. Alexander	.. Glenlmond Farm, Coolumboola	1	3	Do.
Ditto	.. Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings	.. St. Gwithian, Toogooloowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff	.. Inavale Stud Farm, Bunjgurgan, Q.	3	9	Do.
E. Swayne	.. West Plane Creek, Mackay	1	2	Do.

ILLAWARRA.

A. Pickels	.. Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	.. Corndale, Coolabunia	3	43	Do.
W. T. Savage	.. Ramsay	2	22	Do.
Hunt Bros.	.. Springdale, Maleny ..	3	62	Do.

MILKING SHORTHORNS.

P. Young	.. Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	.. Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	.. Torran's Vale, Lane-field	1	9	Do.
W. Middleton	.. Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten	.. "Dunure," Miles ..	2	8	Do.

BEEF BREEDS.

SHORTHORNS.

T. B. Murray-Prior	.. Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall	.. Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan	.. "Arubial," Condamine	3	6	Do.
W. B. Slade	.. E. Glengallan, Warwick	2	20	Do.

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AUSTRALIA.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
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BEEF BREEDS—*continued.*

HEREFORD.

A. J. McConnell	..	Dugandan, Boonah	19	36	Australian Hereford
E. M. Lumley Hill	..	Bellevue House,	45	127	Herd Book Do.
Tindal and Son	..	Bellevue Gunyan, Inglewood	50	400	Do.

SUSSEX.

James T. Turner	..	The Holmwood, Neurum	2	4	Sussex Herd Book of England
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Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FROM 30TH JUNE TO 31ST JULY, 1918.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Buttercup ...	Shorthorn ..	30 May, 1918	934	4.5	46.93	
Lady Melba ...	Holstein ...	31 Mar. "	912	4.5	46.12	
Lady Loch II. ...	Ayrshire ...	13 June "	828	4.7	43.82	
Miss Betty ...	Jersey ...	9 June "	752	4.6	38.90	
Magnet's Leda ...	"	20 June "	724	4.4	34.91	
Constancy ..	Ayrshire ...	7 April "	683	4.5	34.54	
Yarraview Ida's	Guernsey ...	5 May "	514	5.7	33.63	
Hope						
Royal Mistress ...	Ayrshire ...	13 Mar. "	514	5.2	31.55	
Charming Damsel	"	1 May "	660	4.1	30.27	
Lady Peggy ...	"	30 Mar. "	598	4.3	28.83	
Snowflake ...	Shorthorn...	28 June "	608	4.2	28.60	
Rosalie II. ...	Ayrshire ...	2 July "	615	3.5	23.86	
Dawn of Warragaburra	Jersey ...	4 May "	556	3.7	22.87	
Lady Spec...	Ayrshire ...	19 Feb. "	446	4.5	22.45	
Leda's Jessie ...	Jersey ...	25 Mar. "	313	5.8	21.70	
Sylvia II. ...	Shorthorn...	14 July "	431	4.3	20.77	

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JULY, 1918.

Westerly winds and cold nights were again in evidence during the month, and the effect they have had on the light breeds is very noticeable. Some pens dropped 50 per cent. at the commencement of the month, but pulled up during the last week. These adverse weather conditions in no way hampered the laying in the heavy section, and some splendid scores were registered. The previous world's record for winter laying, held by a pen of six Black Orpingtons, has been passed by a pen of six White Leghorns owned by the Dixie Egg Plant. Their score for the four months was 579, the previous records being 570. A Black Orpington in Mr. A. E. Walters's single test pen laid three eggs in twenty-four hours. Two of the eggs had rough shells with no glazing, and one was without a shell. Only one case of such laying has come under our notice before. The last week of the month has shown a decided improvement in the number of eggs laid in almost every pen of the competition. W. Wilson and H. Fraser have each had a bird in for medical treatment, but both are now back in their pens. The following are the individual records:—

Competitors.	Breed.	July.	Total.
LIGHT BREEDS.			
*Dixie Egg Plant	White Leghorns ...	143	579
*G. W. Hindes	Do.	136	496
*E. Chester	Do.	130	486
*G. Howard	Do.	132	477
*C. Knoblauch	Do.	127	476
*C. P. Buchanan	Do.	126	474
*T. Fanning	Do.	126	465
*Geo. Prince	Do.	118	461
*Mrs. L. Henderson	Do.	127	458
*W. Becker	Do.	116	447
*G. H. Turner	Do.	123	443
*W. Lyell	Do.	120	432
*R. Holmes	Do.	136	430
*O.K. Poultry Yards	Do.	103	427
*L. G. Innes	Do.	120	411
*Oakland Poultry Farm	Do.	95	409
*E. A. Smith	Do.	128	407
B. Caswell	Do.	93	407
Harold Fraser	Do.	88	395
Dr. Jennings	Do.	91	389
*Range Poultry Farm	Do.	105	386
*Thos. Taylor	Do.	108	381
O. W. J. Whitman	Do.	102	381
J. J. Davies	Do.	102	381
*C. Porter	Do.	112	372
*Quinn's Post Poultry Farm	Do.	105	261
*J. Zahl	Do.	95	353
R. T. G. Carey	Do.	104	352

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	July.	Total.
LIGHT BREEDS— <i>continued.</i>			
G. Williams	White Leghorns ...	70	346
*Mrs. Coomber	Do.	109	343
S. Wilkinson	Do.	96	317
*J. M. Manson	Do.	113	310
*Homalayan Poultry Farm	Do.	97	306
*T. B. Hawkins	Do.	81	285
Mrs. L. F. Anderson	Do.	74	285
Geo. Trapp	Do.	69	272
Mrs. A. G. Kurth	Do.	67	266
H. F. Britten	Do.	78	264
H. B. Stephens	Do.	75	264
*J. W. Newton	Do.	68	261
Progressive Poultry Pens	Do.	65	259
Shaw and Stevenson	Black Leghorns ...	91	259
*Mrs. R. Hunter	White Leghorns ...	79	256
B. Chester	Do.	99	217
P. O. Oldham	Do.	66	204
W. A. Wilson	Do.	71	199
A. W. Walker	Do.	39	160

HEAVY BREEDS.

Poultry Farm	Black Orpingtons ...	145	530
... ..	Do.	106	421
... ..	Do.	147	408
... ..	Do.	133	406
... ..	Do.	148	390
... ..	Do.	119	377
... ..	Chinese Langshans ...	87	374
... ..	Black Orpingtons ...	98	373
... ..	Do.	123	365
... ..	Do.	136	361
... ..	Do.	141	345
... ..	Do.	149	310
... ..	Do.	67	298
... ..	Do.	130	282
... ..	Rhode Island Reds ...	107	239
... ..	Black Orpingtons ...	117	232
... ..	Rhode Island Reds ...	64	218
... ..	Do.	69	142
Totals ... ..	...	6,804	23,080

* Indicates that the birds are engaged in the single hen test.

DETAILS OF SINGLE HEN TESTS.

Competitor.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
Plant	93	95	104	88	98	101	579
ades	105	85	82	83	77	64	496
r	80	87	74	97	73	75	486
d	74	79	87	77	74	86	477
uch	75	70	91	76	84	80	476
hanan	80	71	84	72	87	80	474
g	85	81	85	51	83	80	465

Viticulture.

PRACTICAL HINTS ON ESTABLISHING A VINEYARD.—No. 4.

By P. MAHONEY.

PRUNING.

The methods proved by experiment by the most practical men for Australian conditions, and witnessed by the writer, are as under:—For spur-pruned vines of a non-vigorous nature:—

It is necessary to have two arms, each about 18 inches long, which is quite long enough, as long arms are likely to have too much barren wood. But this length should not be attained at one pruning. Say about 1 foot, or perhaps less, should be laid down at the first pruning after the vine has been established on the wire. This can then be extended at the rate of about 4 inches at each pruning until the desired length is attained. It is advisable and most profitable to have in such vines the fruiting wood as close as possible to the stem of the vine, for the fruit is superior, and heavier crops are obtained when these facts are borne in mind.

Never should spurs be allowed to grow from the underside of the main arm; they should be as near as possible on top of the arm, and consist of two buds and a base bud, making the cut through the node above the topmost bud retained, thus not exposing the readily-decomposing pitch. Benefit is also derived, for physiologists claim that in the spring time the bud withdraws all nourishment from the node immediately above it. It is far better to cut the spur back and start off from the base bud than to use a long-jointed, thin spur, for such spurs, in the course of time, are likely to be damaged by the implements used in working the ground.

Careful and judicious pruning should create a vine of about five years old with a series of spurs, that is, little crowns, containing three or four spurs, situated 8 or 9 inches apart, along the main arms. No spurs should be left on the stem of the vine.

A vigorous trailing vine is best trained with one arm, for the flow of sap is best regulated when trained in this manner, the length depending on the nature of the vine and quality of soil, from which the pruner is to form his own judgment. As stated, never should the desired length be laid down at one pruning, but extended at the rate of about 4 to 6 inches at each pruning, the initial length depending upon the constitution of the vine. These vines, when established, should also, as before mentioned, contain a series of spurs at about 8 or 9 inches apart along the main arm. Such vines should be trained with the prevailing winds, if any, for on that principle the vine does not suffer as much as it otherwise would from the strong winds. The T trellis is admirably adapted for the training of rod-pruned vines, as such a trellis allows all the fruiting wood to be on the same level. The main arms of a rod-pruned vine should each be about 9 inches to a foot long, and trained along the middle wire of the T trellis. The rods to be tied to the two outside wires, which are about 2 feet apart. It is not necessary to leave spurs from which to produce rods for the coming pruning, but with a little science the base buds on the rods which are to crop can be made to throw out shoots from their base buds to make rods for the following crops. This can be done by fracturing the rods just above the base bud, thus checking the flow of sap, and causing those buds to burst and grow into rods for next year's crop. The whole rod should be treated in this manner, thus causing all the buds along the rod to burst and be productive. They should also be wound tightly around the wire and tied firmly. Long and short rods fruit alike if treated in this manner. Avoid using these rods if possible, for the stouter they are the better. The number of rods to leave varies according to the constitution of the vine.

Spring and summer pruning consists of removing water shoots and other superfluous growth, in the very early stage of their development (these being of no value), so that the nourishment can be utilised by the fruit and useful canes. It is also necessary in forming the young vine. With a little science in pruning, spring and summer pruning can be greatly minimised, and perhaps altogether avoided.

Pinching off the sappy terminals of canes causes a temporary check, thus encouraging the buds to shoot, and it also induces a better sitting of fruit when the flowers are falling from the bunches.

[TO BE CONTINUED.]

Entomology.

TACHINID PARASITE OF THE CANE BORER WEEVIL.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Dr. J. F. Illingworth, Entomologist:—

“ During the month we made a second trip to the Mossman district—this time for a supply of the tachinid parasite of the borer weevil. Though our stay was very brief, we were able to make the most of it, for we were offered every facility at the mill.

“ I was fortunate in locating an abundant supply of the parasites during my previous visit, for Mr. Crees, the manager, informed me that the borer is not very prevalent in the district. My search through hundreds of trucks of cane in the mill yard failed to reveal a trace of them. The particular field where the flies were found was an old nursery of seedling canes, which has had no trash burned—consequently an ideal condition for the borer to propagate. Then, too, in 1910, the breeding-cages from which the tachinid parasites escaped were located alongside this field and the flies have had a good chance to become established.

“ I was surprised to learn that all of the cane of the district is burned before cutting. This may account somewhat for the scarcity of the borers, for the fires destroy a large percentage of those that are left in the discarded canes; or the grubs succumb later to the action of the sun upon the exposed stalks. Furthermore, fully 50 per cent. of the cane grown is D1135, a variety so hard that the borers are not attracted to it. It was interesting to note how the borers picked out the softer varieties in the nursery, where they had a choice.

“ The mill, however, now pays on individual analysis, and this is tending to increase the growing of Clark's seedling and other canes of higher density.

“ Rats are by far the worst pest at Mossman. Soluble strychnine proved a failure, for the rats would not eat the bait. White arsenic has been used there with success; and ‘Rat-nip,’ a trade preparation, containing phosphorus, also gave good results. These were applied to bits of bread and other kinds of food.

“ I was interested to note the scarcity of natural enemies of the tachinid parasites in the district. The exotic ant *Pheidole megacephala*, which proved such a mortal enemy to the young flies in Fiji, is present, though in moderate numbers. In a few cases I found that they had cleaned out the borer channels and were living in them. They are, however, not abundant enough to offer any serious menace to the flies. Furthermore, a considerable search amongst the cane leaves revealed only a single jumping spider. These predators, too, are so abundant in Fiji that often several are to be seen on one stalk. Swallows were rather abundant over the field, but I do not consider them a serious enemy to the tachinids.

“ DISTRIBUTION OF THE PARASITES.

“ My first intention was to bring all of the flies to the Mulgrave, where the borer beetles are proving themselves such a serious pest on the low-lying lands along the river. Very recently, however, I received a letter from the Babinda Association requesting my assistance in the placing of some of the parasites there. A visit to the district proved to me that the pest was very abundant, and particularly so in the region out around Moolaba.

“ I finally decided to liberate the flies from three centres—Moolaba, near the station; Babinda, Dr. Reid's farm; and Gordonvale, Mrs. Moller's farm. A cage has been established at the latter place for breeding the flies; and they are already emerging in considerable numbers.

“ IMPORTANCE OF THE HUMUS SUPPLY IN THE SOIL.

“ I have been making further investigations at Hambledon during the month. They certainly have the best system of supplying humus that I have seen. All the waste from the mill is composted and left for about a year before it is put on the land.

“ This compost is made by building up layers of the various by-products from the mill—filter-press, trash from the carriers, ashes from wood, megass, and so forth—nothing is permitted to go to waste; even dead animals are buried in the pile.

"About thirty loads of this, or about 20 tons, are applied to the acre. It is certainly a very valuable fertilizer, and the cane shows a marked increase in growth where it has been applied. There is one block near the residence of Mr. A. L. Walker (who, by the way, is a grower of keen perception) which is a most excellent experiment. Part of this he treated with the compost, leaving the remainder. The treated cane is almost a foot taller than the other.

"The soil on this farm scours well, and for this reason it is an easy matter to work in trash. Mr. Walker tells me that he leaves the trash from the two last ratoon crops—i.e., volunteering the last ratoons by simply relieving over the rows. After the last crop is cut he ploughs in this double trash and applies compost, or a green crop, which is worked in preparatory to a new series of cane.

"In one field, which he was preparing for September planting at the time of my visit, a bean crop had been turned under, then the soil was treated with about 20 tons of compost. At this third ploughing, the soil was distinctly blackened by the rich supply of humus; and though the surface was clean, Mr. Walker told me that he means to give it five ploughings altogether before planting, to get it in perfect tilth. Is it any wonder that he cuts 50-ton crops without other fertilizers, on land that was once thoroughly infested with white grubs?

"Digging pits in these fields disclosed a fair number of grubs and several of the cocoons of the parasites (wasps), as reported last month. The grubs are the largest that I have seen, which is probably due to the fact that they are so well fed on the compost.

"IMPLEMENTS FOR RED VOLCANIC SOILS.

"Evidently we have not the proper implements for these loose red soils, for it is the general practice among growers to destroy as much trash as possible before ploughing, because they are unable to turn it under.

"There is a crying need for a machine that will chop up the trash, or treat it in some way so that it may be put in by the plough. Perhaps the rolling cutter, which is used for corn stalks in America, would work. It is a heavy implement, drawn by a pair of horses, and the blades are cross-wise of the row. It cuts all the stalks and trash into pieces about one foot long.

"The new American sulky plough with a motor attachment for cutting up weeds and putting them under has received a lot of attention in our magazines; and I was interested in reading in the July Sugar Journal that its fame has reached Australia, through the moving pictures. We, too, are anxious to see it turned loose on heavy cane trash.

"We were able to put under a very heavy crop of Mauritius beans on our experimental plots at Meringa by rolling the vines well just ahead of the ploughs. Treated in this way the discs of the ploughs, if sharp, will cut through the vines easily, providing they are not too old. It is best to turn them under when they are in flower, before the pods are set. If the seed is permitted to ripen there is trouble in store for ever after. Not only are the vines tough and hard to cut, but the dry beans continue to germinate in the soil for many months—some even coming along to climb over and smother the cane after it is laid by.

"LATE PLANTING.

"This is one of the principal subjects of discussion at this season; and, recently, several have told me that they have known late planting to fail because of grubs. It appears that the principal difficulty is due to the lack of cultivation. Investigations, in several instances, showed that the soil became too wet for working just at the time that the beetles were flying.

"It must be made clear, then, that late planting will only succeed on soils which are so easily drained that they may be thoroughly worked through December and January. Most of our red volcanic soils are of this character, and these are the ones that are usually infested when planted early. Let me emphasise that it is *thorough cultivation during the flight of the beetles* that does the business; and that late planting is only to facilitate this.

"I feel confident that the problem can be handled best on the heavy wet soils by the application of abundant humus. Since these soils scour well, trash and green-crops can be easily worked into them. After this preparation, I would advise early planting, for there is no question that this is best where it will succeed. The point here is, that the grubs will leave the growing roots alone if the soil is rich in organic matter."

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR AUGUST, 1918.

Article.							AUGUST.
							Prices.
Bacon	...	...	...	...	...	lb.	9d. to 10d.
Barley	...	...	...	...	...	bush.	2s. 6d. to 4s.
Bran	...	...	...	...	...	ton	£4 15s.
Broom Millet	...	...	...	...	...	"	£60 to £90
Broom Millet (Sydney price)	...	...	...	...	...	"	£60 to £90
Butter (First Grade)	...	...	...	...	...	cwt.	128s. 6d.
Chaff, Mixed	...	...	...	...	...	ton	£3 10s. to £7 10s.
Chaff, Oaten	...	...	...	...	...	"	£5 to £8
Chaff, Lucerne	...	...	...	...	...	"	£3 to £12 15s.
Chaff, Wheaten	...	...	...	...	...	"	£4 10s.
Cheese	...	...	...	...	...	lb.	7½d. to 10½d.
Flour	...	...	...	...	...	ton	£12
Hams	...	...	...	...	...	lb.	1s. 3d. to 1s. 10d.
Hay, Oaten	...	...	...	...	...	ton	...
Hay, Lucerne	...	...	...	...	...	"	£3 10s. to £5
Hay, Wheaten	...	...	...	...	...	"	£4 10s. to £5
Honey	...	...	...	...	...	lb.	3½d. to 4d.
Maize	...	...	...	...	...	bush.	5s. to 5s. 3d.
Oats	...	...	...	...	...	"	3s. 3d. to 4s.
Onions	...	...	...	...	...	ton	£20
Peanuts	...	...	...	...	...	lb.	4d. to 5d.
Pollard	...	...	...	...	...	ton	£5
Potatoes	...	...	...	...	...	"	£5 to £10 10s.
Potatoes (Sweet)	...	...	...	...	...	cwt.	3s. to 3s. 6d.
Pumpkins (Cattle)	...	...	...	...	...	ton	£4 to £5
Eggs	...	...	...	...	...	doz.	11d. to 1s. 3d.
Fowls	...	...	...	...	...	per pair	3s. 6d. to 8s.
Ducks, English	...	...	...	...	...	"	3s. to 4s.
Ducks, Muscovy	...	...	...	...	...	"	4s. to 8s. 6d.
Geese	...	...	...	...	...	"	9s. to 11s. 6d.
Turkeys (Hens)	...	...	...	...	...	"	9s. to 13s.
Turkeys (Gobblers)	...	...	...	...	...	"	15s. to 27s.
Wheat (Milling)	...	...	...	...	...	bush.	4s. 6d.

VEGETABLES—TURBOT STREET MARKETS.

Beans, per sugar-bag	...	...	...	...	...	...	8s. to 13s.
Beetroot, per dozen bunches	...	...	...	...	...	...	9d. to 1s. 9d.
Cabbages, per dozen	...	...	...	...	...	...	1s. 6d. to 5s.
Carrots, per dozen bunches	...	...	...	...	...	...	9d. to 1s. 9d.
Cauliflowers, per dozen	...	...	...	...	...	...	3s. to 10s.
Chokos, per quarter-case	...	...	...	...	...	...	3d. to 1s. 9d.
Cucumbers, per dozen	...	...	...	...	...	...	...
Lettuce, per dozen	...	...	...	...	...	...	1s. to 1s. 6d.
Marrows, per dozen	...	...	...	...	...	...	1s. 6d. to 3s. 6d.
Parsnips, per dozen bunches	...	...	...	...	...	...	9d. to 1s. 9d.
Peas, per sugar-bag	...	...	...	...	...	...	6s. to 10s.
Sweet Potatoes, per cwt.	...	...	...	...	...	...	3s. to 3s. 6d.
Table Pumpkins, per cwt.	...	...	...	...	...	...	3s. 6d. to 4s. 6d.
Tomatoes, per quarter-case	...	...	...	...	...	...	2s. 6d. to 7s.

SOUTHERN FRUIT MARKETS.

Article.	AUGUST.				
	Prices.				
Bananas (Queensland), per case	12s. to 15s.
Bananas (Tweed River), per case	14s. to 20s.
Bananas (Fiji), per bunch...	9s. to 11s.
Bananas (G.M.), per bunch	9s. to 11s.
Bananas (G.M.), per case	22s. to 23s.
Lemons (local), per bushel-case	5s. to 6s.
Mandarins, per bushel-case	1s. to 13s.
Oranges (Navel), per case	8s. to 12s.
Oranges (Queensland), per case	5s. to 9s.
Oranges (Other), per case...
Papaw Apples, (Queensland), per quarter-case
Passion Fruit, per quarter-case	6s. to 8s. 6d.
Pears, per bushel case	15s. to 20s.
Pineapples (Queens), per double-case	8s. to 10s.
Pineapples (Ripleys), per double-case	6s. to 8s.
Pineapples (Common), per double-case	6s. to 8s.
Tomatoes (Queensland), per half-case

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	AUGUST.				
	Prices.				
Apples, Eating, per bushel-case	7s. to 13s.
Apples, Cooking, per bushel-case	8s. to 11s.
Bananas (Cavendish), per dozen	2d. to 6d.
Bananas (Sugar), per dozen	2d. to 6d.
Cape Gooseberries, per quarter-case	8s. to 13s.
Citrons, per hundredweight	8s.
Cocoanuts, per sack	15s. to 25s.
Cumquats, per quarter-case
Custard Apples, per quarter-case	3s. to 5s.
Lemons (Lisbon), per quarter-case	5s. to 7s. 6d.
Mandarins, per case	5s. to 14s.
Oranges (Navel), per case	6s. to 10s. 6d.
Oranges (Seville), per hundredweight	14s.
Oranges (Other), per case	3s. to 6s.
Papaw Apples, per quarter-case	1s. 3d. to 2s. 6d.
Passion Fruit, per half bushel-case	6s. to 11s.
Peanuts, per lb.	4d. to 6d.
Pineapples (Ripley), per dozen	6d. to 2s.
Pineapples (Rough), per dozen	6d. to 1s. 6d.
Pineapples (Smooth), per dozen	1s. to 3s. 6d.
Pomelos (poor man's orange) per hundredweight
Rosellas, per sugar bag
Strawberries, per dozen boxes	6s. to 13s. 6d.
Tomatoes, per quarter-case	2s. 6d. to 9s.

TOP PRICES, ENOGGERA YARDS, JULY, 1918.

Animal.										JUNE.	
										Prices.	
Bullocks	...	...	...	...	...	...	...	...	...	£23 17s. 6d. to	£27 5s.
Cows	...	...	...	...	...	...	...	...	...	£15 2s. 6d. to	£20 10s.
Merino Wethers	...	...	...	...	...	...	...	...	...	45s.	
Crossbred Wethers	...	...	...	...	...	...	...	...	...	50s.	
Merino Ewes	...	...	...	...	...	...	...	...	...	29s.	
Crossbred Ewes	...	...	...	...	...	...	...	...	...	30s.	
Lambs	...	...	...	...	...	...	...	...	...	39s. 3d.	
Pigs (Porkers)	...	...	...	...	...	...	...	...	...	50s.	

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JULY, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JULY, 1918 AND 1917, FOR COMPARISON.

Divisions and Stations.		AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.		AVERAGE RAINFALL.		TOTAL RAINFALL.	
		July.	No. of Years' Records.	July, 1918.	July, 1917.			July.	No. of Years' Records.	July, 1918.	July, 1917.
<i>North Coast.</i>						<i>South Coast—continued:</i>					
Atherton	...	In.		1a.	In.	Nambour	...	In.		In.	In.
Cairns	...	0.90	17	0.68	0.30	Nanango	...	2.67	22	0.87	0.36
Cardwell	...	1.52	36	2.80	Nil	Rockhampton	...	1.77	36	0.15	0.52
Cooktown	...	1.44	46	0.51	0.40	Woodford	...	1.48	31	0.04	0.41
Herberton	...	0.96	42	2.40	0.09			2.59	31	Nil	0.27
Ingham	...	0.62	31	0.99	0.22	<i>Darling Downs.</i>					
Innisfail	...	1.59	26	0.41	0.09	Dalby	...	1.83	48	0.09	0.67
Mossman	...	4.65	37	3.75	0.54	Emu Vale	...	1.45	...	0.38	0.74
Townsville	...	1.46	10	1.48	0.02	Jimbour	...	1.75	...	0.04	0.60
		0.55	47	Nil	Nil	Miles	...	1.83	33	0.02	0.81
<i>Central Coast.</i>						Stanthorpe	...	1.97	45	0.59	1.57
Ayr	...	0.56	31	0.18	Nil	Toowoomba	...	2.02	46	0.44	0.47
Bowen	...	0.95	47	0.09	Nil	Warwick	...	1.81	31	0.23	0.77
Charters Towers	...	0.56	36	Nil	Nil	<i>Maranoa.</i>					
Mackay	...	1.64	47	1.45	Nil	Roma	...	1.43	44	0.24	0.23
Proserpine	...	1.04	15	1.03	N-1	<i>State Farms, &c.</i>					
St. Lawrence	...	1.26	47	0.10	Nil	Bungewongorai	...	1.18	4	0.24	0.14
<i>South Coast.</i>						Gatton College	...	1.38	...	0.16	0.40
Biggenden	...	1.34	...	0.30	0.65	Gindie	...	1.16	...	0.07	0.37
Bundaberg	...	1.49	35	0.40	0.22	Hermitage	...	1.50	...	0.35	0.92
Brisbane	...	2.25	67	0.17	0.55	Kairi	...	0.90	4	0.84	Nil
Childers	...	1.71	23	0.38	0.23	Kamerunga	...	1.38	...	1.96	0.02
Crohamhurst	...	2.92	25	0.32	0.57	Sugar Experiment	...	1.35	10	0.97	Nil
Esk	...	1.99	31	0.15	0.63	Station, Mackay	...	0.95	4	Nil	0.70
Gayndah	...	1.53	47	0.27	0.73	Warren	...				
Gympie	...	2.18	48	0.39	1.14						
Glasshouse M'tains	...	2.37	10	0.27	0.22						
Kilkivan	...	1.76	39	0.59	0.85						
Maryborough	...	1.99	47	0.40	0.53						

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for July this year, and for the same period of 1917, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		PHASES OF THE MOON.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6:3	5:34	5:29	5:47	4:59	6:5	4:46	6:28	The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania. H. M.
2	6:2	5:34	5:27	5:47	4:58	6:5	4:46	6:28	
3	6:1	5:35	5:26	5:48	4:57	6:6	4:46	6:29	5 Sept. ☉ New Moon 8 44 p.m.
4	6:0	5:35	5:25	5:48	4:56	6:7	4:46	6:30	14 „ ☾ First Quarter 1 3 a.m.
5	5:59	5:36	5:24	5:49	4:55	6:8	4:46	6:31	20 „ ☉ Full Moon 11 1 p.m.
6	5:58	5:36	5:22	5:50	4:54	6:9	4:46	6:32	27 „ ☽ Last Quarter 2 39 p.m.
7	5:57	5:36	5:21	5:50	4:54	6:9	4:46	6:32	The Moon will be farthest from the earth on the 8th, and nearest to it on the 21st.
8	5:56	5:37	5:20	5:51	4:53	6:10	4:46	6:33	
9	5:54	5:37	5:19	5:51	4:53	6:10	4:46	6:34	5 Oct. ☉ New Moon 1 5 p.m.
10	5:53	5:38	5:18	5:52	4:52	6:11	4:47	6:35	13 „ ☾ First Quarter 3 0 p.m.
11	5:52	5:38	5:17	5:52	4:52	6:12	4:47	6:35	20 „ ☉ Full Moon 7 35 a.m.
12	5:51	5:39	5:16	5:52	4:51	6:13	4:47	6:36	27 „ ☽ Last Quarter 3 35 a.m.
13	5:50	5:39	5:16	5:53	4:51	6:13	4:48	6:36	The Moon will be farthest from the earth on the 6th, and nearest to it on the 20th.
14	5:49	5:40	5:15	5:53	4:50	6:14	4:48	6:37	
15	5:47	5:40	5:15	5:53	4:50	6:15	4:49	6:37	4 Nov. ☉ New Moon 7 2 a.m.
16	5:46	5:41	5:14	5:54	4:49	6:16	4:49	6:38	12 „ ☾ First Quarter 2 46 a.m.
17	5:45	5:41	5:13	5:54	4:49	6:17	4:50	6:38	18 „ ☉ Full Moon 5 33 p.m.
18	5:44	5:41	5:12	5:55	4:48	6:17	4:50	6:39	25 „ ☽ Last Quarter 8 25 p.m.
19	5:43	5:42	5:11	5:55	4:48	6:18	4:50	6:39	The Moon will be farthest from the earth on the 2nd and 20th, and nearest on the 17th.
20	5:42	5:42	5:10	5:56	4:48	6:19	4:51	6:40	
21	5:41	5:43	5:9	5:56	4:48	6:20	4:51	6:40	4 Dec. ☉ New Moon 1 19 a.m.
22	5:40	5:43	5:8	5:57	4:47	6:21	4:52	6:41	11 „ ☾ First Quarter 12 31 p.m.
23	5:39	5:44	5:7	5:58	4:47	6:21	4:52	6:41	18 „ ☉ Full Moon 5 18 a.m.
24	5:37	5:44	5:7	5:58	4:47	6:22	4:53	6:42	25 „ ☽ Last Quarter 4 31 p.m.
25	5:36	5:44	5:6	5:59	4:47	6:23	4:54	6:42	The Moon will be nearest to the earth on the 15th, and farthest from it on the 27th. There will be an annular or ring-shaped Eclipse of the Sun on 3rd December, but it will not be visible in Australia.
26	5:35	5:45	5:5	5:59	4:46	6:24	4:54	6:43	
27	5:33	5:45	5:4	6:0	4:46	6:25	4:55	6:43	
28	5:32	5:46	5:3	6:1	4:46	6:25	4:55	6:44	
29	5:31	5:46	5:2	6:2	4:46	6:26	4:56	6:44	
30	5:30	5:46	5:1	6:3	4:46	6:27	4:56	6:45	
31	...	...	5:0	6:4	...	...	4:57	6:45	

For places west of Brisbane, but nearly on the same parallel of latitude— $27\frac{1}{2}$ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, and November may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night, when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Orchard Notes for October.

THE SOUTHERN COAST DISTRICTS.

As October is often a dry month throughout the greater part of the State, one of the most important duties of the fruitgrower is to keep his orchard or vineyard in a thorough state of cultivation, thus retaining the moisture in the soil that is essential to the setting and development of the fruit crop. As long as the land is level one cannot over-cultivate, as there is no danger of the soil washing, but when the orchard is on a hillside heavy thunderstorms, which may occur during the month, are very apt to cause heavy washaways of soil if the land is kept in the high state of tilth necessary to retain moisture. In this case the cultivation should always be across and not up and down the face of the hill, and where the soil is of such a nature that it will wash badly thin blocks, consisting of a row or two of a growing crop or of light timber, brushwood, or even a body of weeds or heavy mulching, should be provided, such blocks to follow the contour of the orchard. If dry, and water for irrigation is available, citrus trees will be the better for a thorough watering during the month. Give the trees a good soaking, and follow the irrigation by systematic cultivation, as this is much better than constant surface watering, as practised by the Chinese. Examine the orchard and vineyard carefully for pests of all kinds. When young trees are showing signs of scale insects, cyanide same; when leaf-eating insects of any kind are present, spray the plants that are being attacked with arsenate of lead. Look out carefully for black spot and oidium in grape vines, using Bordeaux mixture for the former and sulphur for the latter. When using sulphur, see that you get a fine sample—viz., one in which the particles of sulphur are in a very fine state, as the finer the sulphur the better the results. Do not apply the sulphur in the early morning, but during the heat of the day, as it is the sulphur fumes, not the sulphur, which do the good. A knapsack sulphurer is the best machine for applying sulphur to grape vines, trees, or plants.

Examine any late citrus fruits or early summer fruits for fruit-fly, and take every precaution to keep this great pest in check now, as, if fought systematically now, it will not do anything like the same amount of damage later on as if neglected and allowed to increase unchecked. October is a good month for planting pineapples and bananas. Be sure and have the land properly prepared prior to planting, especially in the case of pineapples, as the deeper the land is worked and the better the state of tilth to which the surface soil is reduced the better the results, as I am satisfied that few crops will pay better for the extra work involved.

THE TROPICAL COAST DISTRICTS.

As the fruit-fly usually becomes more numerous at this time of year, especial care must be taken to examine the fruit thoroughly prior to shipment, and to cull out all fruit that has been attacked by the fly. Banana and pineapple plants may be set out, and the orchards should be kept well tilled so as to have the land clean and in good order before the heavy summer growth takes place.

All the spring crops of citrus fruits should be now marketed, and the trees, where necessary, should be pruned and sprayed, and the land be well ploughed. The ploughing should be followed by harrowing and cultivating, so as to get the surface of the land in good order. Granadillas and papaws should be shipped to the Southern markets, as, if care is taken in packing and they are sent in the cool chamber, they will carry in good order. These fruits should not be gathered in an immature condition, as, if so, they will never ripen up properly. They should be fully developed but not soft, and if gathered in this condition, carefully handled, and packed and shipped in cool storage, they will reach the Southern markets in good condition, and, once they become commonly known, will meet with a ready sale.

THE SOUTHERN AND CENTRAL TABLELANDS.

In the Stanthorpe district the spraying of apple, pear, and quince trees for codling moth will have to be carefully carried out, the best spray being arsenate of lead, of which there are several reliable brands on the market.

When fungus diseases, such as powdery mildew, &c., are also present, Bordeaux mixture should be combined with the arsenical spray.

The vineyard will require considerable attention, as the vines must be carefully disbudded, and any signs of oidium or black spot should be checked at once. Look out for late spring frosts, and, if possible, try the effect of smudge fires producing dense smoke for preventing any damage.

Keep the orchards and vineyards well cultivated, as it is of the utmost importance to keep the moisture in the soil at this time of the year if a good fruit crop is to be secured.

In the warmer districts cultivation is all-important, and when irrigation is available it should be used for both fruit trees and vines, a thorough soaking followed by systematic cultivation being given.

Farm and Garden Notes for October.

FIELD.—With the advent of warmer weather and the consequent increase in the soil temperature, weeds will make great headway if not checked; therefore our advice for last month holds good with even greater force for the coming month. Earth up any crops which may require it, and keep the soil loose among them. Sow maize, sorghum, setaria, imphee, prairie grass, panicum, pumpkins, melons, cucumbers, marrows. Plant sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, and ginger. Coffee plants may be planted out. There are voluminous articles in previous journals giving full instructions how to manage coffee plants, from preparing the ground to harvesting the crop, to which our readers are referred. The planting of the sisal agave and the fourcroya may be proceeded with at any time of the year, but the best time is in spring and beginning of summer, when warm weather and good showers will enable the young plants to root quickly and become firmly established before the winter. The demand for the fibre is constantly increasing, and the supply does not nearly overtake the demand, but, owing to the want of shipping facilities no oversea shipments can be made. Hence, the price of the fibre is abnormally high, up to £95 and £100 per ton. Plant only on dry or well-drained soil. Cotton may still be sown.

KITCHEN GARDEN.—Our notes for this month will not vary much from those for September. Sowings may be made of all kinds of vegetables. We would not, however, advise the sowing of cauliflowers, as the hot season fast approaching will have a bad effect on their flowering. French beans, including butter beans, may be sown in all parts of the State. Lima and Madagascar beans should also be sown. Sow the dwarf Lima beans in rows 3 ft. apart with 18 in. between the plants. The kitchen garden should be deeply dug, and the soil reduced to a fine tilth. Give the plants plenty of room, both in sowing and transplanting, otherwise the plants will be drawn and worthless. Thin out melon and cucumber plants. Give plenty of water and mulch tomato plants planted out last month. Asparagus beds will require plentiful watering and a good top-dressing of short manure. See our instructions in "Market Gardening," obtainable on application to the Under Secretary, Department of Agriculture and Stock. Rosella seeds may be sown this month. No farm should be without rosellas. They are easily grown, they bear heavily, they make an excellent preserve, and are infinitely preferable to the mulberry for puddings. The bark supplies a splendid tough fibre for tying up plants. The fruit also makes a delicious wine.

FLOWER GARDEN.—The flower garden will now be showing the result of the care bestowed upon it during the past two months. The principal work to be done this month is the raking and stirring of the beds, staking, shading, and watering. Annuals may be sown as directed for last month. Plant chrysanthemums, gladiolus and other bulbs, such as tuberose, crinum, ismene, amaryllis, paneratium, hermocallis, hippeastrum, dahlias, &c. Water seedlings well after planting, and shade for a few days. Roses should now be in full bloom. Keep free from aphids, and cut off all spent flowers. Get the lawn-mower out and keep the grass down. Hoe the borders well, and trim the grass edges.

General Notes.

A POTATO TEST.

Before buying potatoes (says "The Journal of the Jamaica Agricultural Society"), cut a sample potato in half. Put the two cut ends together. If they stick, the potato is good and mealy; if they slide apart, the potato is watery and of poor quality.

PICKLE FOR HAM.

Honey in place of sugar is used in brine for curing ham, and is highly recommended; it is said to be a favourite in France. The brine calls for 4 lb. of coarse salt, 1 oz. of saltpeter, 2 lb. of honey, and 2 gallons of water. Let the brine stand for twenty-four hours; then immerse the meat in it and let it stay in pickle for six weeks.

TREATMENT OF TRAVEL-TRIED TREES.

"South African Gardening" writes:—

"The South African Railways never earned too good a reputation for prompt handling of perishable goods. They could not be expected to have improved since the outbreak of war, and they certainly have not.

"Judging from our own experiences, there are likely to be some trying journeys before fruit and rose trees this planting season, and many parcels will doubtlessly arrive at their destinations in a dry, shrivelled condition.

"When this happens there is no need to despair. If they are not very bad, plunging them bodily in a barrel or tank of water for a few hours will probably restore plumpness.

"In bad cases, they will revive better if buried in moist soil for a week or ten days. Just dig out a deep wide trench, lay the trees bodily, and cover them over with soil. Occasional examination will prove to what extent they have been restored to a normal state, and when this is complete they can be dug up and planted in the usual way."

[A few years ago a consignment of young orange-trees was sent from Brisbane to New Guinea. They arrived, although carefully packed in stout cases, in very bad condition. Somebody at Port Moresby advised placing them in a trench as above described, and several trees recovered; and, after planting, these revived and did well.—Ed., "Q.A.J."]

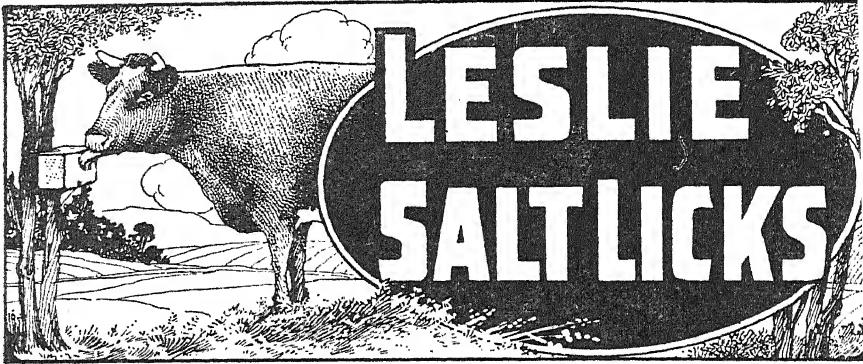
PRESERVING EGGS.

Firstly, get an earthenware crock or jar, which is the best receptacle; failing this a small barrel (pork or beef) well cleaned out; or a kerosene tin, which serves fairly well. Secondly, bear in mind that the eggs must be perfectly fresh, not sat upon even a night or day, must not be soiled, and if infertile, all the better. Infertile eggs keep and eat much better. When about to arrange for preserving eggs, we confine the cocks for a week before and during the process of collecting the eggs for preserving.

Waterglass is the best preservative, but when this cannot be obtained, the lime method is the next best. Many consider this method entirely satisfactory, though instances are known where eggs so preserved have tasted slightly of lime. To prepare the lime water, dissolve 2 or 3 lb. of unslaked lime in 5 gallons of water that has previously been boiled and allowed to cool, and allow the mixture to stand until the lime settles and the liquid is clear. Place clean, fresh eggs in the vessel and pour the clear limewater into the vessel until the eggs are covered. At least 2 in. of the solution should cover the top layer of eggs. Sometimes 1 lb. of salt is used with the lime, but experience has shown that in general the lime without the salt is quite satisfactory.

Place the crock containing the preserved eggs in a cool, dry place, well covered to prevent evaporation. Waxed paper covered over and tied around the top of the crock will answer this purpose.

Using Preserved Eggs.—Fresh, clean eggs, properly preserved, can be used satisfactorily for all purposes in cooking and for the table. When preserved eggs are to be boiled, a small hole should be made in the shell with a pin at the large end before placing them in the water. This is done to allow the air in the egg to escape when heated so as to prevent cracking. ("Journal of the Jamaica Agricultural Society.")



INCREASED MILK YIELD

invariably follows on the use of the Tonic Salt Blocks.

Leslie Salt Licks

They assure at least 10 per cent. increase in returns, because they increase the milk flow and improve the quality of the fat globules in the milk. This means Richer Cream—Better Butter—AND MORE OF IT!

They increase the flow of saliva—hence digestion is simplified and the cow must increase its yield of milk.

They keep the cows well-conditioned and fortify them against epidemics. These Licks have been found an effectual PREVENTATIVE against Redwater, Abortion, and TUBERCULOSIS. By improving the digestion they safeguard the stock from Impaction, Cripples, Rickets, and other common ailments to such an extent that losses from these causes are reduced very considerably.

Milk from cows that have been correctly “salted” will be found to be free from taints and to keep fresh much longer than any milk.

The milking period can be carried to its full extent because the nourishing ingredients in the Licks supply the constituents for the bones and tissues of the unborn calf.

2/- per block, or 22/6 per case of one dozen.

WHOLESALE FROM—

Buzacott & Co. Ltd.

Smellie & Co. Ltd.

Siemon & Sons Ltd.

Adelaide St., Petrie's Bight, Brisbane.

Brisbane, Cairns, Ayr.

Brisbane, Ipswich, Townsville, and
Charters Towers.

New Zealand Loan & Mercantile Agency Co. Ltd.

Eagle Street, Brisbane.

G. & W. Barter

South Brisbane and Toowoomba.

Butler Bros.

Charlotte Street, Brisbane.

Hooker Chapman & Co.

Edward Street, Brisbane.

Country Orders—Freight to be Added.

QUEENSLAND AGRICULTURAL JOURNAL

VOL. X.

OCTOBER, 1918.

PART 4.

Agriculture.

CORNGROWING COMPETITION, 1918-19.

1. This competition will be open to all under the age of eighteen years who are residents of the State of Queensland. An entrance fee of 2s. 6d. must be forwarded to the Under Secretary with the application to enter.

2. Applications to be enrolled in the competition, containing the following particulars, must be forwarded to the Under Secretary, Department of Agriculture and Stock, Brisbane, to reach him, if possible, not later than 29th September, 1918:—

(a) Full name and address. (Give Christian names in full.)

(b) Date of birth. (Day, month, and year.)

(c) No. of Division in which applicant resides, and the name of the Dairy Inspector who supervises the locality.

3. The area to be devoted to the planting of the seed maize shall be one-tenth of an acre, selected seed for which, 1½ lb. of Improved Yellow Dent, will be posted, free of cost.

4. Each competitor shall have absolute freedom in his choice of ground, and in the methods he may adopt in preparing, planting, and cultivating his plot; but in no case shall a plot exceed one-tenth of an acre. Yields will be calculated, when judging, on the basis of this area.

The following table shows the length the rows must be to give the exact area according as four, five, six, or more rows are planted:—

Number of Rows Four Feet Apart.	Length of Rows in Feet.	Number of Rows Four Feet Apart.	Length of Rows in Feet.
4	272 ft. 3 in.	8	126 ft. 1½ in.
5	217 ft. 10 in.	12	96 ft. 9 in.
6	181 ft. 6 in.	16	68 ft.
7	155 ft. 7 in.		

5. Each competitor will be required to keep a record chart showing the dates and particulars of the different stages of work, and these charts must be delivered, at the time of harvesting, to the officer appointed for superintending and verifying the yield, and this officer will post them on to Brisbane.

6. Within seven days from the verification of the yield from the crop, each competitor shall select, without aid from other persons, twelve uniform cobs of the maize from his crop, and forward them, with a letter of advice, to the Department of Agriculture and Stock, Brisbane. (The cobs should be packed in straw envelopes, commonly used in packing beer bottles, and then placed tightly in a case which should be labelled and branded with the initials of the competitor and the number allotted to his district.)

7. Competitors must notify the Dairy Inspector for the district of the date when the crop shall have matured and be ready for inspection. *Unless this rule is observed the competitor will be disqualified.* The maize must be thoroughly dry and ripe when harvested.

8. No competitor shall be allowed to employ or permit any labour upon the competition plot standing in his name, other than his own personal labour, excepting in relation to the driving of horses, for which, owing to circumstances, such help may be needed.

9. The competition will close on the 30th June, 1919, and the prizes will be allotted thus—

The competitors will be grouped according to the following divisions:—

(4) The district supervised by—

Mr. E. W. Ladewig, Dairy Inspector, Beenleigh.

Mr. L. J. Kelly, Dairy Inspector, Harrisville.

Mr. A. K. Henderson, Dairy Inspector, Rosewood.

(2) The district supervised by—

Mr. C. C. Pickering, Dairy Inspector, care of Miss Macpherson, Victoria street, West End

Mr. R. G. Ridgway, Dairy Inspector, Ellerslie Crescent, Taringa, Brisbane.

Mr. L. J. Verney, Caboolture.

Mr. R. Winks, Dairy Inspector, Gympie.

Mr. J. A. Midgley, Dairy Inspector, Bundaberg.

Mr. W. S. Harding, Dairy Inspector, Esk.

- (3) The district supervised by—

Mr. J. H. Barber, Dairy Inspector, Crow's Nest.

Mr. J. J. Carew, Dairy Inspector, Gatton

- (4) The district supervised by Mr. S. K. Crowther, Dairy Inspector, Kingaroy

- (5) The district supervised by—

Mr. J. D. Ogilvie, Dairy Inspector, Clifton.

Mr. S. A. Clayton, Toowoomba.

Mr. J. R. D. Munro, Dairy Inspector, Warwick.

- (6) The district supervised by Mr. D. Downs, Dairy Inspector, Gayndah.

- (7) The district supervised by—

Mr. J. Cattanach, Dairy Inspector, Dalby.

Mr. R. S. Sigley, Dairy Inspector, Roma.

The Stock Inspector, Goondiwindi.

- (8) The Central District of Queensland, including that supervised by Mr. L. Moriarty, Dairy Inspector, Rockhampton.

- (9) The Northern district of Queensland, including that supervised by—

Mr. G. A. Smith, Stock and Dairy Inspector, Mackay.

Mr. J. P. Carey, Yungaburra.

10. Three special prizes of the value of £10, £5, and £3 will be awarded to the competitors who stand first, second, and third in the entire competition.

DISTRICT PRIZES.—FIRST, £5; SECOND, £2; THIRD, £1.

If there are less than six competitors, prizes will be allotted as follows:—

Four to five competitors (inclusive), two prizes, first and second.

Two to three competitors (inclusive), one prize only, first.

When only one competitor, he or she will be debarred from participating in the District Prize, but will be eligible to compete for the Special Prizes.

NOTE.—It is in the interest of the entrants to encourage others to compete for the valuable prizes being offered.

No money prizes will be given, but each successful competitor will be allowed to select some article to the value of his prize.

No prize will be awarded unless the yield of corn equals 20 bushels per acre. This stipulation may be waived under very exceptional circumstances in the case of a lower yield.

11. The aggregate points will be 100, and the judging will be based upon the following:—

	Points.
(a) Quality of maize produced	15
(b) Yield of plot	75
(c) Notes and records of plot	10

12. The Director of Agriculture will be the sole judge of the competition, and his decision shall be final.

WILLIAM LENNON,

Secretary for Agriculture and Stock.

Brisbane, 2nd September, 1918.

COTTON IN THE WEST INDIES.

The following notes on the cotton-growing industry in the Barbados are published in the Annual Report of the Department of Agriculture of Tortola for 1918, and show the results of the operations of the Government Cotton Factory during the season 1916-1917:—

For some years past the putting into operation of a profit-sharing scheme in connection with the working of the Government Cotton Factory has been under discussion. Local opinion was opposed to the scheme.

However, it was decided to put a profit-sharing scheme into force. Under that scheme, a first payment of up to 5c. per lb. of seed-cotton is made, and any profits remaining after all accounts concerning the crop have been made up are to be divided as follows:—To the Government 25 per cent. and to the contributing growers 75 per cent. Quite how the scheme would have worked in a normal season it is impossible to say. There was a promise of an excellent crop of cotton, but this promise was not fulfilled on account of the gale. High prices led to the intervention of private speculators, who bought a good deal of the seed-cotton, and exported it to St. Kitts.

The combined effect was a large drop in the amount of cotton dealt with at the Government Ginnery.

The ginnery was opened for the purchase of seed-cotton on 21st October, 1916, and purchasing was continued each week till 5th May. During that time 57,570 lb. of seed-cotton was bought and dealt with.

The 57,570 lb. of seed-cotton yielded 15,253 lb. of clean lint, or 26.4 per cent.

The net cost of ginning, baling, and shipment to St. Thomas and St. Kitts, after deducting £16 17s. 3d., value of stores carried forward, amounted to £109 11s. 11d., or 3.6c. per lb. of clean lint. This high cost is accounted for by the price of baling material, fuel, and lubricating oils, and, in some degree, by the fact that large quantities of cotton can be dealt with at a cheaper rate in proportion than small lots.

THE JERUSALEM ARTICHOKE.

Although this is one of our most excellent and most easily grown vegetables, strange to say it is only cultivated to a very limited extent in this State by either farmers or market gardeners. It is not only of great value as human food but is an excellent and profitable crop for feeding swine, which thrive remarkably well upon the tubers. The so-called Jerusalem artichoke is really not what its name implies. The true artichoke is a chard or thistle, of which the bottoms of the flowers and the rib-like sepals are used as food. The botanical name of this true artichoke is *Cynara scolymus*; the so-called Jerusalem artichoke is *Helianthus tuberosus*, one of the sunflowers. The name Jerusalem is simply a corruption of the word "Girasole," which the Italians give to both the sunflower and the Jerusalem artichoke, meaning turning to the sun. The stems, leaves, and flowers bear a great resemblance to the Japanese sunflower. It is, in fact, a tuber-bearing sunflower, whose value lies in its tubers, which grow clustered in large numbers round the roots, and resemble knotty English potatoes. It is a very hardy plant, and may

be cultivated successfully in any fairly good soil in all except the most arid regions. It thrives, however, to the greatest perfection in moderately rich, sandy loam, with a moderate amount of moisture. In low-lying or ill-drained soil the tubers will quickly rot away. It is essentially a drought-resisting plant.

The cultivation is extremely simple, and does not call for any extra care or skill. All that is needed is that the land be ploughed or dug deeply and thoroughly pulverised. The tubers are then planted at a shallow depth (4 to 5 inches) in rows 3 feet apart and 18 inches between the sets. It takes about 15 lb. of tubers to plant a rod (16 perches) of land. As in the case of potatoes, the smaller tubers may be planted whole and the larger cut into sets containing two or three eyes. The plants grow to a height of from 4 to 6 feet. The best time to plant is early in the spring, or in July and August, and the tubers will be uninjured in the ground until the soil is warm enough to cause them to sprout. In ordinary seasons, the crop will be ready for digging in from five to six months. If not required for immediate use, they may be left in the ground and taken up at any time, and do not suffer injury from frost. If dug, they should not be exposed to the air, as they will not keep long without shrivelling up and becoming soft. They may, however, be pitted like sweet or English potatoes.

Independent of its value as a vegetable, the Jerusalem artichoke forms, as said, an excellent food for pigs, for which purpose, on the farm, it is best to run two or three furrows across the rows and turn in the pigs, and they will gather all they want. There will be quantities of small tubers left in the ground even after the pigs have been pastured on the field. Consequently, in the early spring, a bountiful crop of young plants will spring up. When these plants are a few inches high they should be ploughed out into rows 3 feet apart, and then thinned out to a stand of one plant to every 18 inches. In this manner the artichokes will form a next season's crop, and a good supply of pig food be obtained.

As compared with the potato, the Jerusalem artichoke yields about double the quantity of nutritive matter—in fact, its value as a food is equal to the cereal grains. Another advantage possessed by this vegetable is that it is more easily digested and not so liable to cause flatulency as the potato, and consequently may be safely eaten by delicate persons.

The "Journal of the Board of Agriculture," London (April, 1918), gives the composition of artichokes and potatoes as follows:—

	Water.	Proteins.	Total Carbohydrates.	Calories per lb.
Artichokes	79.	2.6	16.7	365
Potatoes	75.5	1.8	14.7	310

On rich garden soil the artichoke will yield as much as 20 tons per acre, and an average yield from field cultivation is about 10 to 12 tons.

PROSPECTS OF THE PEANUT INDUSTRY.

We have frequently advised the extensive planting of this crop, which goes indifferently by the name of peanut, earth nut, and ground nut. One reason why peanuts should be grown is, that there is an unlimited demand for oil seeds, amongst which the peanut ranks high; in fact, so excellent is the oil extracted from these nuts that it is said to be sold as pure lucca, or salad oil, made from olives. Another reason is, that heavy crops can be obtained without the use of manure or of irrigation, on sandy soils which will produce scarcely any other payable crop. A third inducement to planting peanuts is, that very little cultivation is required after preparation of the land and keeping the young plants clear of weeds until the vines are overground. As in the case of the sweet potato, the peanut vines make excellent fodder for stock, being first turned into hay. Previous to the great war the selling price of the nuts averaged £18 per ton, and at that price, even a 2,000-lb. crop would prove infinitely more remunerative than maize, wheat, arrowroot, and many other crops. £18 per ton is a little over 2d. per lb. The present-day price in the English market is £32 per ton in the shell. In the Brisbane markets peanuts sell at from 3d. to 6d. per lb. retail, or from £37 to £56 per ton.

There is no fear of over-production. Before the war, France—or, rather, one single seaport of France (Marseilles)—imported from India and Africa nearly 200,000 tons of peanuts annually.

The nuts contain from 30 to 50 per cent. of oil, the best of which is, as we have said, used as a substitute for olive oil, and the lower-grade oil is used to an enormous extent for manufacturing soap and for lubricating machinery. Peanut meal, which

is the residue after the oil has been extracted, is a foodstuff of high value, and ranks far above cotton-seed meal, which is one of the most richly concentrated meals found on the market to-day. The nuts, both raw and roasted, are largely eaten by all classes of people.

SOIL AND CLIMATE.

The peanut prefers a rather sandy, loamy soil, which should contain enough vegetable matter to make it light and porous, but it can be profitably grown on a very wide range of soils, provided they contain a sufficient amount of lime.

Since the trade demands a light-coloured shell, nuts of equal flavour and quality grown on dark-coloured soils do not find a ready sale. There is an abundance of good peanut soil in Queensland.

The peanut will thrive under a great variety of climatic conditions, provided there is a season of at least five months free from frosts. It has been thought by some that the peanut only grows well in a warm climate, but this is a mistake, since the nuts develop chiefly during the cool weather in the late summer and early autumn. Weather conditions most favourable to maximum production are an early spring, warm, even summer temperature, with a well-distributed rainfall, and a comparatively dry autumn. Of course, climate has an influence on the character and composition of the nuts, since it has been demonstrated that in tropical countries a larger percentage of oil is obtained. As to any other influences which climate may exert but little is known.

FERTILISERS.

Since the peanut is adapted for growth on a soil which is not naturally rich in any of the essential elements of plant food, the proper fertilisation of the crop becomes a matter of the utmost importance. It has been found that 60 bushels of nuts with a ton of hay will remove from the soil about 85 lb. of nitrogen, 15 lb. of phosphoric acid, 32 lb. of potash, and 47 lb. of lime. Of this amount, about 41 lb. of nitrogen, 6 lb. of phosphoric acid, 20 lb. of potash, and 42 lb. of lime were found in the hay; and since the vines would either be left on the ground or fed to stock, and the resulting manure applied to the land, the peanut is seen to be a comparatively easy crop on the land as far as soil exhaustion is concerned. It must be remembered that the plant derives a large percentage of its nitrogen from the air. The needs of a crop of peanuts may be supplied by 1,300 lb. of acid phosphate, 300 lb. of dried blood, and 400 lb. of muriate of potash. This mixture would contain about 2 per cent. of nitrogen, 10.4 per cent. of phosphoric acid, and 10 per cent. of potash. This should be used at the rate of 300 to 500 lb. per acre. Cotton-seed meal may be used to supply the nitrogen, and kaint the potash, although larger amounts of these per acre would have to be supplied.

Farmyard manure may be used to advantage, and will increase the vigour of the plant. Lime may be employed where wanting in the soil, in various forms, 20 to 30 bushels per acre being sufficient.

CULTIVATION.

The cultivation of the peanut is a very simple matter. The seed-bed should be finely pulverised to a depth of at least 5 in., then harrowed and rolled to obtain a level surface. Only well-developed and perfectly matured seed should be planted. About 2 bushels of seed in the pod should be allowed for each acre of land. Planting may be done at any time after danger of killing by frost is past. The seed is usually sown in drills 3 to 3½ ft. apart, and the kernels are placed from 15 to 18 in. apart in the drills. The land must be kept thoroughly clear of weeds, and this must be done early in the season, since the runners must not be disturbed after they form and spread.

HARVESTING.

Peanuts must be harvested before frosts occur, as frost injures both the vines and the kernels. The crop is generally harvested by means of a plough without a mouldboard, and which has a swordlike cutting share attached to the side. The knife passes under the row without injuring the nuts, and cuts the roots. Men following behind the plough with pitchforks, shake the nuts free from the soil,

and pile them in windrows. Other labourers follow and stack them around poles 7 ft. high, which are set at convenient places in the field. Care is taken to see that the vines do not come in contact with the soil, and the nuts are placed on the outside of the stacks. After the stack has been completed it is carefully covered with straw or grass as a roofing to keep off the water during rainy weather. After curing in these stacks for twenty days or more, the peanuts are ready to be picked. This is slow and tedious work, and one of the greatest expenses of the peanut-grower. After the nuts are picked, they should be cleaned before being packed in sacks, which hold about 100 lb. each.

VARIETIES.

There is a number of varieties of peanuts, all of which are cultivated extensively. Of these, the Virginia "bunch" and "running" are two of the most popular and widely known in the trade. In Australia, we have only two varieties—the ordinary little dwarf, mostly grown by Chinese gardeners, and the "Giant." The latter develop into magnificent plants, with deep tap-roots and widely spreading stems. They yield, on an average, about 100 good pods per acre. As fifty "Giants" go to make 1 lb., this is equivalent to 2 lb. per plant, or considerably over 4 tons (8,960 lb.) to the acre. But it would not be wise to reckon always on such yields, 2 tons being nearer the average crop. Even at that rate, peanut-growing pays better than horseracing (when you win at the latter game, which is seldom the case), whilst in gardening you are always on the winning side. At current market prices, an acre of peanuts may run fairly up to the three figures, whilst, at the price paid for seeds, one may reckon by hundreds.

In a paper on the peanut in the "Agricultural Gazette of New South Wales," 2nd July, 1918, by W. D. Kerle, Experimentalist, Hawkesbury Agricultural College, much valuable information on this crop is given, and is thus summarised:—

1. There are large areas of suitable land in the State.
2. The climatic conditions are favourable.
3. There is an extensive market for nuts of good quality for roasting and confectionery.
4. There are large quantities of edible and crude peanut oil imported annually, which could be produced locally.
5. The leading importers are prepared to use locally-grown nuts if the quality is equal to the imported article.
6. The protection afforded by the import duties of 2d. per lb. on nuts and 2s. 6d. per gallon on edible oil, with the possibility of increased duty when the area of production warrants it.
7. Excellent machines for handling in all stages of the industry are procurable from overseas.
8. The uses to which the peanut is put are ever increasing, and the demand is greater each year.
9. It is of considerable value on the farm holding as a soil-renovating crop and a quick-fattening fodder for all classes of stock.

This being so, how is it that so few of our farmers and others go in for this crop? We feel sure that, if the peanut were better known, there would not be a single farm, station, school, or cottage garden without its large or small crop of peanuts, which would supply both man and beast with that proportion of healthy vegetable fat which should never be wanting in a healthy and well-balanced diet.

GRAIN AND GRASS.

As an instance of the adoption of new methods that might be called revolutionary, we draw attention to the fact that England is growing wheat and oats on grass *without ploughing*. The seed and fertiliser are drilled in by a special tool on the end of the drills. This, as described by the *London Times*, is done

in July, and the growing crop is pastured off that autumn. The next spring the grain and grass are harvested together, the grain heads being cut by a "header," while the grass and grain straw are cut by another knife on the same machine. The claim is made that a sturdy growth of grain results, and that the grass sod is not injured. The aim is to prevent the ploughing up of all the permanent English pastures, owing to the need for growing more grain for war-feeding purposes. It is claimed that no injury is done to the grass sod—which would be sacrilege in England—while the sod serves to protect the grass from freezing or drought damage. Expense of ploughing is avoided, and the land is kept available for cattle pasturing. The war is causing us to use our wits, to devise new methods, to turn over old ones to see whether they are as sound as we thought.—"Farm Bulletin."

MARKET FOR LINSEED.

In our September issue, it was stated that Messrs. Meggitt, Limited, linseed oil and meal manufacturers, Sydney, guarantee growers of linseed a market for at least 10,000 tons annually. We have now been informed by the firm that their requirements approximate not less than 24,000 tons per annum. We refer our readers to the article on "Linseed and Flax Growing" in the Journal for September, for full instruction as to the cultivation, harvesting, threshing, and marketing of this valuable crop.

A THRIVING FARM HOMESTEAD IN THE GLADSTONE DISTRICT.

We are indebted to Mr. G. Carter, M.L.A., member for Port Curtis, for the following notes on farm settlement in the Boyne Valley, which will give some idea of what may be done by an energetic man on the land in this fertile district:—

The accompanying photos are taken from the farm of Mr. Nicholas Hellen, Boyne Valley, Gladstone district, and will serve to illustrate the

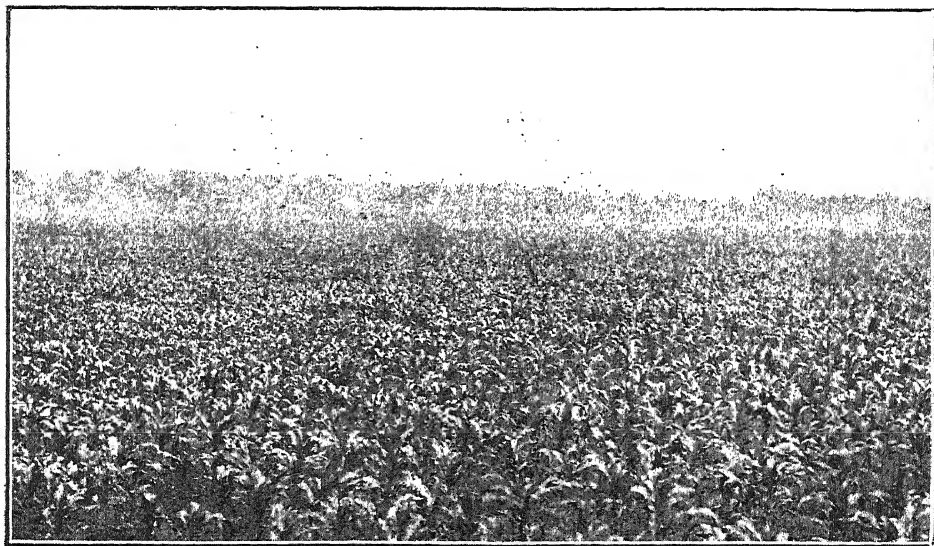


fertility and suitability of this extensive valley for closer settlement. The best of this well-watered and rich area is at present held under pastoral leases that will shortly expire, and the whole or greater portion,



1 and 2.—A crop (this year) of 52 acres of potatoes, which averaged about 5 tons to the acre, and were of excellent quality.

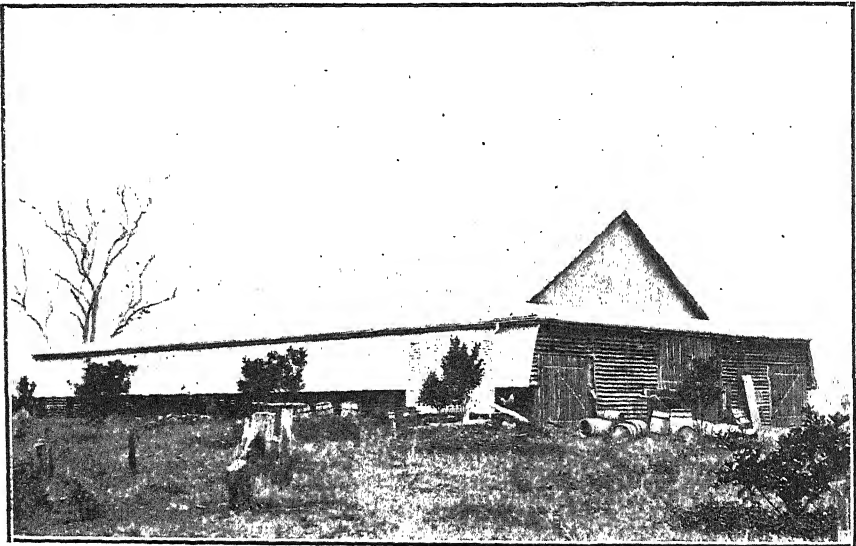
I understand, will then be made available by the Lands Department for agricultural and grazing farms. There will be room for a large number of settlers, and as the land is well adapted for both general, dairying,



3.—An area of about 50 acres of maize, which returned a very heavy yield of first-class quality.



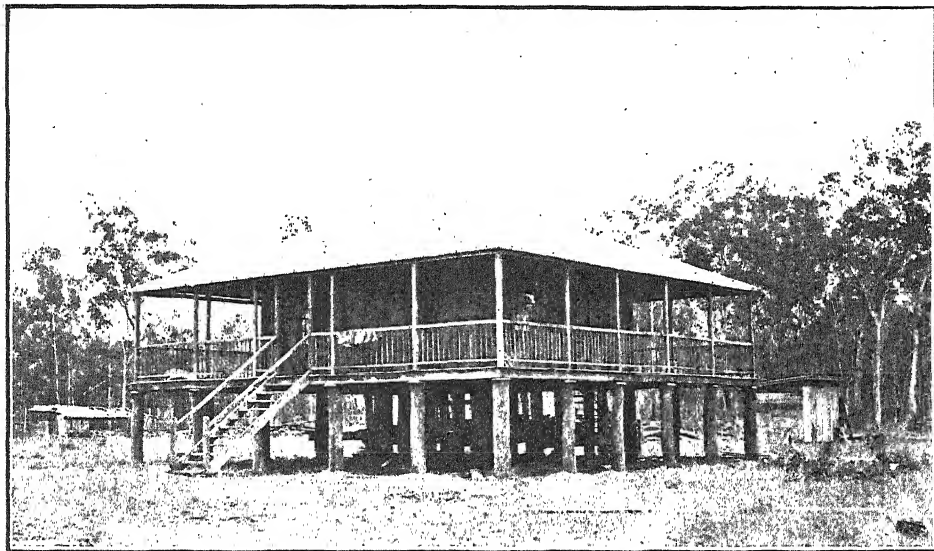
4.—Photo. of Mr. Hellen driving his own motor-plough.



5.—The barn, erected prior to the war, at a cost of £1,000.

and fruit farming, it should make an excellent settlement for returned soldiers.

Mr. Hellen's farm is about 40 miles by rail from the North Coast Trunk Railway Line, and about 45 miles from the magnificent deep-water port of Gladstone.



6.—The kitchen.

The photos give a good representation of the salient features of the farm.

THE COTTON INDUSTRY.

Cotton-seed may still be sown during this month, and in late Southern districts in November. As stated in the Departmental Announcements in another part of this issue of the Journal, the Department of Agriculture continues to make a free distribution of first-class Upland cotton-seed to intending growers, and during 1919, when early application for seed should be made, intending growers stating at the same time the area which it is intended to devote to this crop. The Department undertakes to advance 2d. per lb. on all cotton delivered at the ginnery in William street, Brisbane, when it will be ginned and marketed on owners' account, and any surplus, after sale, will be paid to the growers *pro rata*, after deduction of charges. Consignments are to be forwarded addressed to the Under Secretary, Department of Agriculture and Stock, Brisbane, who should be advised of the despatch. Ten pounds of seed will be supplied per acre, to provide for replants or other contingencies.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		PHASES OF THE MOON.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6:3	5:34	5:29	5:47	4:59	6:5	4:46	6:28	<p>The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.</p> <p>H. M.</p> <p>5 Sept. ● New Moon 8 44 p.m.</p> <p>14 „ ☾ First Quarter 1 3 a.m.</p> <p>20 „ ○ Full Moon 11 1 p.m.</p> <p>27 „ ☽ Last Quarter 2 39 p.m.</p> <p>The Moon will be farthest from the earth on the 8th, and nearest to it on the 21st.</p>
2	6:2	5:34	5:27	5:47	4:58	6:5	4:46	6:28	
3	6:1	5:35	5:26	5:48	4:57	6:6	4:46	6:29	
4	6:0	5:35	5:25	5:48	4:56	6:7	4:46	6:30	
5	5:59	5:36	5:24	5:49	4:55	6:8	4:46	6:31	
6	5:58	5:36	5:22	5:50	4:54	6:9	4:46	6:32	<p>5 Oct. ● New Moon 1 5 p.m.</p> <p>13 „ ☾ First Quarter 3 0 p.m.</p> <p>20 „ ○ Full Moon 7 35 a.m.</p> <p>27 „ ☽ Last Quarter 3 35 a.m.</p> <p>The Moon will be farthest from the earth on the 6th, and nearest to it on the 20th.</p>
7	5:57	5:36	5:21	5:50	4:54	6:9	4:46	6:32	
8	5:56	5:37	5:20	5:51	4:53	6:10	4:46	6:33	
9	5:54	5:37	5:19	5:51	4:53	6:10	4:46	6:34	
10	5:53	5:38	5:18	5:52	4:52	6:11	4:47	6:35	
11	5:52	5:38	5:17	5:52	4:52	6:12	4:47	6:35	<p>4 Nov. ● New Moon 7 2 a.m.</p> <p>12 „ ☾ First Quarter 2 46 a.m.</p> <p>18 „ ○ Full Moon 5 33 p.m.</p> <p>25 „ ☽ Last Quarter 8 25 p.m.</p> <p>The Moon will be farthest from the earth on the 2nd and 29th, and nearest on the 17th.</p>
12	5:51	5:39	5:16	5:52	4:51	6:13	4:47	6:36	
13	5:50	5:39	5:16	5:53	4:51	6:13	4:48	6:36	
14	5:49	5:40	5:15	5:53	4:50	6:14	4:48	6:37	
15	5:47	5:40	5:15	5:53	4:50	6:15	4:49	6:37	
16	5:46	5:41	5:14	5:54	4:49	6:16	4:49	6:38	<p>4 Dec. ● New Moon 1 19 a.m.</p> <p>11 „ ☾ First Quarter 12 31 p.m.</p> <p>18 „ ○ Full Moon 5 18 a.m.</p> <p>25 „ ☽ Last Quarter 4 31 p.m.</p> <p>The Moon will be nearest to the earth on the 15th, and farthest from it on the 27th.</p> <p>There will be an annular or ring-shaped Eclipse of the Sun on 3rd December, but it will not be visible in Australia.</p>
17	5:45	5:41	5:13	5:54	4:49	6:17	4:50	6:38	
18	5:44	5:41	5:12	5:55	4:48	6:17	4:50	6:39	
19	5:43	5:42	5:11	5:55	4:48	6:18	4:50	6:39	
20	5:42	5:42	5:10	5:56	4:48	6:19	4:51	6:40	
21	5:41	5:43	5:9	5:56	4:48	6:20	4:51	6:40	
22	5:40	5:43	5:8	5:57	4:47	6:21	4:52	6:41	
23	5:39	5:44	5:7	5:58	4:47	6:21	4:52	6:41	
24	5:37	5:44	5:7	5:58	4:47	6:22	4:53	6:42	
25	5:36	5:44	5:6	5:59	4:47	6:23	4:54	6:42	
26	5:35	5:45	5:5	5:59	4:46	6:24	4:54	6:43	
27	5:33	5:45	5:4	6:0	4:46	6:25	4:55	6:43	
28	5:32	5:46	5:3	6:1	4:46	6:25	4:55	6:44	
29	5:31	5:46	5:2	6:2	4:46	6:26	4:56	6:44	
30	5:30	5:46	5:1	6:3	4:46	6:27	4:56	6:45	
31	5:0	6:4	4:57	6:45	

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, and November may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night, when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Book Societies is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
 The Shorthorn Herd Book of Queensland;
 The Jersey Herd Book of Queensland;
 The Illawarra Herd Book of Queensland;
 The Ayrshire Herd Book of Queensland;
 The Milking Shorthorn Herd Book of Queensland;
 The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
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DAIRY BREEDS.

AYRSHIRES.

L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	10	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview," Southbrook	7	34	Do.

JERSEYS.

T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoor	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, <i>vid</i> Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
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DAIRY BREEDS—*continued.*

GUERNSEYS.

Queensland Agricultural College	Gatton	2	2	Eligible, but no Guernsey Herd Book of Australia
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HOLSTEINS.

Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman	.. "St. Athan," Wyreema	12	47	Do.
F. G. C. Gratton	.. "Fowlerton," Kings-thorpe	1	15	Do.
R. S. Alexander	.. Glenlmond Farm, Coolumboola	1	3	Do.
Ditto	Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings	.. St. Gwithian, Toogoolowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff	.. Inavale Stud Farm, Bunjgurgan, Q.	3	9	Do.
E. Swayne	West Plane Creek, Mackay	1	2	Do.

ILLAWARRA.

A. Pickels	Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	Corndale, Coolabunia	3	43	Do.
W. T. Savage	Ramsay	2	22	Do.
Hunt Bros.	Springdale, Maleny..	3	62	Do.

MILKING SHORTHORNS.

P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	Torran's Vale, Lane-field	1	9	Do.
W. Middleton ..	Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten ..	"Dunure," Miles ..	2	8	Do.

BEEF BREEDS.

SHORTHORNS.

T. B. Murray-Prior	.. Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall	.. Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan	.. "Arubial," Condamine	3	6	Do.
W. B. Slade	E. Glengallan, Warwick	2	20	Do.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
BEEF BREEDS—<i>continued.</i>				
HEREFORD.				
A. J. McConnell	.. Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill	.. Bellevue House, Bellevue	45	127	Do.
Tindal and Son	.. Gurnyan, Inglewood	50	400	Do.
SUSSEX.				
James T. Turner	.. The Holmwood, Neurum	2	4	Sussex Herd Book of England

THE FRIESIAN CATTLE CLUB OF AUSTRALIA.**HOLSTEIN-FRIESIAN CATTLE.**

At its annual meeting recently, the Friesian Cattle Club of Australia decided to reopen the Appendix of its Herd Book until 1st of April, 1919, for females showing not less than three-quarter pure blood, provided that they were approved by the Inspector on type, conformation, and colour. This step was taken in the interests of breeders in the Southern States who had not availed themselves of this appendix when it was opened two years ago.

Forms and full particulars on application to the Secretary, 303 Queen street, Brisbane.

PREPARATION OF WOOL CLIP FOR MARKET.—No. 1.

By R. WILSON, Assistant Instructor in Sheep and Wool.

CROSSBRED CLASSING.

Owing to late comment in the Press by the State Wool Committee and others in regard to the indifferent and faulty methods of preparing a wool clip for market I take the opportunity of giving some practical information on the subject.

Crossbreds were specially mentioned, as that class of sheep and wool are not so well known in Queensland as those of the merino, and in consequence do not receive the same careful handling. The classing of crossbred wool differs from merino classing, the latter being classed more by its general characteristics, while crossbred is classed according to the fibre.

In merinos we have first and second combings and clothings, classed mostly on account of their length, yield, and general appearance, whilst in crossbreds yield plays an unimportant part, as this description of wool does not vary in condition sufficiently to make two sorts of the one quality as in merinos, where one may be heavy and the other light.

The qualities of the merinos range from 60s. to 70s. for all practical purposes, while crossbreds have a wider range, from 36s. to 54s., and comebacks 56s. to 58s.

I mention the latter, as they are often found in a crossbred clip.

In the classing of the crossbreds *fibre* must be considered the main feature, other considerations taking next place.

I will take, for example, a clip of about 30,000, where the qualities would range from, say, 36s. to 54s., or 56s.

AAA (or fine) crossbred to contain all sound, lengthly-stapled fleeces of good colour and appearance and qualities, ranging from a good 48s. to 54s., having an average spinning value of about 50s. quality.

Where there are sufficient quantities of comeback wool to justify making a finer sort than your AAA, do so, and brand it "*super crossbred*."

AA (medium) crossbred to contain wool from 44s. to 46s. qualities, and any of the rougher 48s. that would suit the lower class better than the first.

All other features mentioned in the first line to be considered.

A (strong) crossbred to contain all qualities from 40s. and under.

The three lines, AAA, AA, and A will carry the bulk of the clip, but it may be necessary to make a line of the shorter-stapled fleeces or of a tender sort.

Short-stapled wool may be a little irregular in quality, but of short, blocky staples, and would suit the requirements of hosiery, the wool being short and spongy.

The irregularities in this line would be well compensated by the regularity of your leading lines as well as making a line suitable to the hosiery trade.

Rolling.—All fleeces should be rolled on the shoulders, showing the white skin side outward.

Skirting.—As clips differ so materially, the question must be left to the grower or expert employed.

I would advise that, should the burr, seed, or discoloured patches be light, they should be taken off, but if they are spread over the fleece, then only the lightest skirting possible be taken off, including rough bitty pieces and fatty edges.

Skirtings should be carefully picked over and put into various grades, as follows:—

1st Pieces crossbred should consist of all the biggest and lightest pieces.

2nd Pieces crossbred much the same as in merino. In a clip where skirtings are inclined to be heavy, sorting should be done well, and if practicable, all the britch pieces taken out, packed separately, and branded A pieces.

The reason for doing this is on account of the britch wool being so much rougher in quality than the wool from the sides, shoulders and neck, thus making two even lines of two distinct qualities.

Bellies, stain, and locks to be treated as in the case of the merino.

Small numbers of crossbreds should not be as finely classed. Any number from 10,000 sheep and upward could be treated on about the same lines as a clip of 40,000.

In clips numbering less than 10,000, which are more common in Queensland, the bulk of the fleece should be worked into two lines with, if necessary, a cast sort. The two bulk lines should be kept as even as possible, which would necessitate the cast sort being uneven.

As crossbreds cut a larger fleece and take up more space in a bale than merino, more can be done with them when in small numbers.

Where there are only a few crossbreds in a merino clip, it is always best to roll them unskirted and pack separately.

Should you have sufficient to make a bulk line, skirt lightly and pack pieces, bellies, &c., separately.

Classing of all wools, whether merino or crossbred, depends entirely on the bulk we are working from, and it is useless to try and force a sort when the clip you are handling does not contain it.

So when handling a clip of crossbreds where the finest quality is a 46s., gauge your sort accordingly, and do not think you must get a fine 50s. crossbred from every crossbred clip, but make it according to the quality that predominates.

[TO BE CONTINUED.]

A PRACTICAL SCHEME FOR THE ERADICATION OF THE RABBIT PEST.

By L. G. JONES.

The following suggestions for the elimination of the rabbit pest in Queensland by the writer, who has had considerable experience in rabbit-infested country in Tasmania, are well worth the attention of grazing farmers and others located in country where rabbits are numerous. Mr. Jones writes:—

We know that all schemes up to the present for the destruction of rabbits have been proved to be failures, more or less. When a station is grossly infested with rabbits, and the owner lays poison, a small percentage will be picked up dead, and the run will appear fairly clean; and at first sight, particularly if a man is of a sanguine nature, he will fool himself into the belief that they have all died in their burrows, hollow logs, &c., and conclude that he has done good work. Not so. Bunny is a very cunning animal. When a rabbit becomes poisoned, he squeals and shows other signs of distress, which alarms those not poisoned, and they drive into the next paddock; and if the laying of poison has been general over the whole station they drive on to the neighbouring stations. Then, after awhile, if the neighbours lay poison they drive back again. This is a fact, as anybody that has had experience in this matter will confirm. Likewise with destruction by trapping. All experienced rabbit-trappers know that in the early part of the rabbit season or when a trapper first sets his traps at a warren there is no need for him to shift his traps for two or three days, but as the season progresses it calls for a good deal of skill on the part of the trapper to make good catches, when he will need to shift his traps every day and often long distances if he desires to make good catches, and at the end of the season the run appears to be very clean. Very few rabbits are seen aboveground. The number of skins sold prove conclusively that the apparent scarcity is not due to the numbers that have been caught. No; they get cunning and avoid the traps and drive away from the locality where the traps are, and often stay underground for long periods during the hunting season. The same remarks apply to all other forms of rabbit destruction—hunting, shooting, ferreting, &c.

A general conception of how to cope with this pest will be as follows:—

Firstly, the Government should make a monopoly of all rabbit, hare, and marsupial skins, and make it illegal for any person or persons to traffic in them. All skins would then go through their hands, and they (the Government) should hold these skins and sell them at such a price as will defray the cost of catching them.

Secondly, the Government should then set the price of rabbit-skins, say, at 6s. per dozen (large and small), leaving no incentive for people to farm them. This

would have the effect of starting thousands of people catching rabbits in their spare time, Saturdays and Sundays, and thousands of others would be after them exclusive of any other work, because it would pay them so to do.

Thirdly, as it was judged that the rabbits in a district were getting scarce I would raise the price of the skin. This would not be adding expense to the scheme, because you would be buying a less number of skins. And as the rabbits got still more scarce I would raise the price again and again (always keeping up the incentive to kill) until I brought them within the power of their natural enemies, when I would expect them to complete the job.

This scheme would work itself out, without any expensive staff. Naturally if you make a thing worth having people will go after it, and the destruction of rabbits would become general. Follow this principle as far as it takes you and you will soon see the rabbit pest a thing of the past.

DEHORNING WITH SAW OR CLIPPERS.

After the horns of calves have reached a certain size it becomes necessary to cut them off. Saws and clippers are the two common instruments used for this purpose. The clippers are quicker and less painful to the animal, but the saw does not crush the horn as do the clippers, especially in the case of old animals whose horns have become hard and brittle. On the other hand, when the saw is used there is not so much bleeding, as the action of the saw causes the blood vessels to be lacerated, and a clot of blood forms quickly.

Clippers give very good results with young cattle, but with old animals the saw should be used, as the crushing of the hard bone in an older animal causes the bone to splinter, which makes a wound that heals very slowly. The loss of blood from older animals will also be more likely to cause trouble than with younger animals. Although some stockmen prefer using the clippers altogether, it is much safer to use the saw altogether than it is to use the clippers altogether. A desirable compromise would be to use the saw on the hard, brittle horns of the older animals and the clippers on the soft, tender horns of the younger animals.

Whichever instrument is used, care should be taken to cut enough of the horn to insure that unsightly stubs will not grow out. From one-eighth to one-half inch of skin should be taken off to insure this. When this is done the horn-forming cells are probably destroyed, which prevents further growth of horns. If none of the skin is taken off the stubs of horns will grow out and sometimes are almost as effective in hooking as the original horn. Occasionally, too, such a stub will grow down into the eye of the animal, which makes it necessary to perform the operation again.

TREATMENT AFTER DEHORNING.

Cattle should never be dehorned during warm weather—that is, weather that is warm enough to cause danger of the wound becoming infested with screw worms. If there is any danger of flies whatever, some fly-repellant should be applied to the wound immediately after the animal is dehorned. Either coal tar or pine tar is very satisfactory. Both are non-irritating and adhere well to the skin and the wound. Whichever of these is used, if too thick to apply conveniently, may be thinned with fish oil or linseed oil. Either an ordinary paintbrush or a swab made by tying a rag on a stick may be used to apply the tar.

The practice of placing a piece of cotton outing flannel over the wound made by dehorning, as advocated by some stockmen, usually meets with poor results, except possibly when the cattle are to be turned into fields where they will be exposed to burrs or to severe winds. In such cases the cloth protects the wound to some extent. Ordinarily, it requires too much time and trouble, and not 50 per cent. of the cloths will stick after they are put on. The practice of using a hot iron to sear the wound and stop the bleeding is not practicable, nor is it necessary.

If in spite of all precautions the wound becomes infested with screw worms they may be removed by saturating a piece of absorbent cotton with chloroform and inserting it into the wound, or by pouring gasoline into the horn cavities. The chloroform or gasoline will kill the screw worms, after which they may be removed with a pair of forceps, a probe, or by forcing the animal's head to one side and allowing them to drop out. Carbolic acid or some other efficient disinfectant may be used for killing the worms, but these are not so effective as chloroform or gasoline. If the carbolic acid solution is used, add three tablespoonfuls of the acid to a quart of water. A stronger solution than this is liable to injure the skin or the tender tissue of the wound. This solution can be applied with a syringe or by using a brush or a swab.

After the worms have been removed, either pure pine tar or one of the coal-tar disinfectants in proper dilution may be applied.—“Pastoral Review.”

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FROM 31ST JULY TO 31ST AUGUST, 1918.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Auntie's Lass ...	Ayrshire ...	3 Aug., 1918	1,211	3.5	50.60	
Lady Melba ...	Holstein ...	31 Mar. "	971	3.2	36.22	
Miss Betty ...	Jersey ...	9 June "	542	4.7	30.01	
Rosalie II. ...	Ayrshire ...	2 July "	503	5.0	29.68	
Magnet's Leda ...	Jersey ...	20 June "	538	4.6	29.15	
Skylark ...	Ayrshire ...	25 July "	643	4.4	28.29	
Buttercup ...	Shorthorn ...	30 May "	730	3.2	27.25	
Charming Damsel ...	Ayrshire ...	1 May "	526	4.4	27.24	
La Hurette Hope ...	Jersey ...	10 July "	501	4.6	27.15	
Miss Security ...	Ayrshire ...	19 July "	632	3.5	25.86	
Sylvia II. ...	Shorthorn ...	14 July "	678	3.2	25.36	
Nina ...	" ...	19 July "	674	3.2	25.02	
College Bluebell ...	Jersey ...	18 July "	602	3.0	24.87	
College Damsel ...	Holstein ...	4 Aug. "	739	2.8	24.33	
Lady Margaret ...	Ayrshire ...	27 Dec., 1917	448	4.6	24.27	
Leda's Jessie ...	Jersey ...	25 Mar., 1918	333	5.3	23.88	
Yarraview Ida's Hope ...	Guernsey ...	5 May "	491	4.8	23.29	
Miss Edith ...	Jersey ...	23 Dec., 1917	265	6.2	23.09	
Dawn of Warragaburra ...	" ...	4 May, 1918	424	4.6	22.98	
Lady Peggy ...	Ayrshire ...	30 Mar. "	569	3.4	22.63	
Lady Loch II. ...	" ...	13 June "	533	4.6	22.44	
Snowflake ...	Shorthorn ...	28 June "	530	3.4	22.06	
Mistress Bee ...	Jersey ...	23 Jan. "	311	5.9	21.72	

NOTE ON THE JUICE OF THE CHOKO.

The following note on the juice of the choko vegetable was sent to the Government Botanist of New South Wales, Mr. J. H. Maiden, and was published in the July issue of the "Agricultural Gazette of New South Wales":—

The writer, Mr. E. W. Smith, of Bexley, said—"A few weeks ago, my wife informed me that when she was peeling a choko, her hands became numb, and she thought they were becoming paralysed. A fortnight later the same thing happened under similar circumstances, and I came to the conclusion that the juice of this vegetable must have local anæsthetic properties. I have since had this opinion confirmed from questions I put to another lady whose experience was the same. I feel sure that the concentrated juice of this vegetable would prove a very powerful and valuable local anæsthetic." Mr. Maiden stated that, on speaking to a member of his household on the subject, she at once replied that the peeling of chokos makes her hands cold and rough, and therefore she always uses a fork in order that she may touch them as little as possible.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, AUGUST, 1918.

All pens, with the exception of one or two odd cases, are now in full lay. Broodiness has not been so prevalent as during the corresponding month last year. The following competitors have had broodies:—Mee (4), Feilly (3), W. Smith (2), Lutz (1), Fitzpatrick (1), Claussen (1), and Puff (1). Three deaths have occurred, viz.:—Zahl (2) and W. Reilly (1). Five cases of sickness have been treated. Some fine laying has been done by the heavy breeds during the month. D. Fulton's "A" bird has laid for forty-three consecutive days, and "C" for forty-one days. The "A" bird missed only three days from 5th June. The weather on the whole has been good, though some cold nights have been experienced, on some of which the thermometer registered 4 degrees below freezing point. During the month the eggs were weighed, with the results shown in table below. In carry out this weighing each individual egg was weighed, and, though complete details cannot be given, one very interesting point stood out in the case of the pullets which are being single tested. Thus it was found that in some cases the pullet laid consecutive eggs of almost identical weight. For example: G. W. Hindes's "D" bird laid five consecutive eggs of 2 oz. each, and throughout Mr. Hindes's hens showed little individual variation. In other cases, hens laid on consecutive days eggs of very varying weights (double-yolked eggs were not considered): thus, Mrs. A. T. Coomber's "B" bird laid eggs weighing $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{8}$, $1\frac{3}{4}$, and $1\frac{3}{4}$ oz. As a matter of analysis, 25 birds showed no variation, 139 a variation of $\frac{1}{8}$ oz., 56 a variation of $\frac{1}{4}$ oz., 5 a variation of $\frac{3}{8}$ oz., 4 a variation of $\frac{1}{2}$ oz., and 1 a variation of $\frac{5}{8}$ oz. Thus it would seem that uniformity of eggs is a character which may be bred in our pullets. From the table of weights it will be seen that there are a fair number of birds amongst the light breeds below standard, but amongst the heavy breeds the condition is deplorable, only 5 out of the 18 competing groups yielding eggs up to requirements, while 47 out of the 66 single tested birds are ineligible for prizes. One other point is worthy of notice. The pen of the Dixie Egg Plant, which put up the very fine record of 579 eggs up till the 31st July, yielded another nine eggs by 2nd August. Thus their total for the four full months of winter laying (the College competition started on 3rd April) is 588 eggs, a world's record for numbers. This

is unfortunately largely discounted, inasmuch as every one of the six birds concerned lays an egg below the standard of 24 oz. to the dozen. The following are the individual records:—

Competitors.	Breed.	August.	Total.
LIGHT BREEDS.			
*Dixie Egg Plant	White Leghorns ...	144	723
*G. W. Hindes	Do.	137	633
*E. Chester	Do.	145	631
*G. Howard	Do.	143	620
C. P. Buchanan	Do.	136	610
*C. Knoblauch	Do.	133	609
*G. Prince	Do.	140	601
*T. Fanning	Do.	131	596
*G. H. Turner	Do.	137	580
*W. Becker	Do.	133	580
*Mrs. L. Henderson	Do.	118	576
*R. Holmes	Do.	137	567
*W. Lyell	Do.	134	566
*L. G. Innes	Do.	135	546
*O.K. Yards	Do.	119	546
*Oakland Poultry Farm	Do.	132	541
*E. A. Smith	Do.	133	540
B. Caswell	Do.	122	529
*Dr. E. O. Jennings	Do.	125	514
H. Fraser	Do.	111	506
*Range Poultry Farm	Do.	115	501
J. J. Davies	Do.	117	498
*T. Taylor	Do.	115	496
*Quinn's Post Poultry Farm	Do.	134	495
*Chris. Porter	Do.	122	494
O. W. J. Whitman	Do.	108	489
*Mrs. A. T. Coomber	Do.	128	471
*J. Zahl	Do.	118	471
R. T. G. Carey	Do.	110	462
*J. M. Manson	Do.	130	440
*Homalayan Poultry Farm	Do.	124	430
G. Williams	Do.	80	426
Mrs. L. F. Anderson	Do.	128	413
S. Wilkinson	Do.	91	408
*T. B. Hawkins	Do.	122	407
Mrs. A. G. Kurth	Do.	114	380
G. Trapp	Do.	106	378
*Mrs. R. Hunter	Do.	121	377
Shaw and Stevenson	Black Leghorns ...	118	377
*J. W. Newton	White Leghorns ...	115	376
H. B. Stephens	Do.	108	372
H. F. Britten	Do.	104	368
Progressive Poultry Pens	Do.	88	347
B. Chester	Do.	120	337
P. C. Oldham	Do.	112	316
W. A. Wilson	Do.	96	295
A. W. Walker	Do.	114	274
HEAVY BREEDS.			
*Nobby Poultry Farm	Black Orpingtons ...	138	668
*E. F. Dennis	Do.	144	550
*E. Morris	Do.	141	549
*A. E. Walters	Do.	157	547
T. Hindley	Do.	123	544
*Mars Poultry Farm	Do.	136	497

EGG-LAYING COMPETITION—*continued.*

Competitors.					Breed.	August.	Total.
HEAVY BREEDS— <i>continued.</i>							
*W. Smith	...	...	...	...	Black Orpingtons	124	497
*R. Burns	...	...	...	...	Do.	146	491
*W. H. Reilly	...	...	...	...	Chinese Langshans	117	491
*J. W. Macrae	...	...	...	...	Black Orpingtons	119	484
E. M. Larsen	...	...	...	...	Do.	105	482
*D. Fulton	...	...	...	...	Do.	164	474
A. Shanks	...	...	...	...	Do.	138	420
W. J. Mee	...	...	...	...	Do.	98	396
T. W. Lutze	...	...	...	...	Do.	132	364
*F. A. Claussen	...	...	...	...	Rhode Island Reds	124	363
H. Puff	...	...	...	...	Do.	90	308
J. Fitzpatrick	...	...	...	...	Do.	124	266
Totals	...	...	...	...	...	8,023	31,103

* Indicates that the pen is engaged in the single hen test.

RESULTS OF SINGLE HEN PENS.

Competitor.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
Dixie Egg Plant	116	117	130	112	121	127	723
G. W. Hindes	131	107	104	105	100	86	633
E. Chester	105	112	97	123	96	98	631
G. Howard	96	104	110	102	98	110	620
C. P. Buchanan	99	95	107	96	110	103	610
C. Knoblauch	99	92	115	98	104	101	609
Geo. Prince	73	111	109	106	97	105	601
T. Fanning	110	98	108	71	106	103	596
W. Becker	96	97	79	112	89	107	580
G. H. Turner	54	77	108	109	127	105	580
Mrs. L. Henderson	101	86	97	64	112	116	576
R. Holmes	110	102	89	88	80	98	567
W. Lyell	99	102	102	92	84	87	566
O.K. Poultry Yards	83	102	104	83	100	74	546
L. G. Innes	94	114	122	60	57	99	546
Oakland Poultry Farm	78	99	102	103	85	83	541
E. A. Smith	70	107	96	106	95	66	540
Dr. E. C. Jennings	73	109	97	83	90	62	514
Range Poultry Farm	33	115	62	89	95	107	501
Thos. Taylor	54	96	92	74	85	95	496
Quinn's Post Poultry Farm	111	66	80	69	104	65	495
C. Porter	49	91	96	71	88	99	494
J. Zahl	100	76	90	88	67	50	471
Mrs. Coomber	52	96	75	81	55	102	471
J. M. Manson	104	95	106	49	35	51	440
Homalayan Poultry Farm	93	79	60	52	92	54	430
T. B. Hawkins	83	67	94	46	64	53	407
Mrs. R. Hunter	61	93	11	60	69	83	377
J. W. Newton	72	101	27	49	72	55	376
HEAVY BREEDS.							
Nobby Poultry Farm	125	108	100	100	114	121	668
E. F. Dennis	116	93	85	41	123	92	550
E. Morris	77	91	111	109	94	67	549

DETAILS OF SINGLE HEN TESTS—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.
HEAVY BREEDS— <i>continued.</i>							
A. E. Walters	90	115	69	99	113	61	547
W. Smith	125	91	28	82	75	96	497
Mars Poultry Farm	83	96	85	83	77	73	497
W. H. Reilly	87	111	89	81	75	95	491
R. Burns	73	82	64	70	108	94	491
J. W. Macrae	48	50	107	78	98	103	484
D. Fulton	88	84	69	65	39	129	474
F. A. Claussen	71	68	46	71	76	31	363

WEIGHTS OF EGGS, SINGLE HEN PENS.

Competitor.	A.	B.	C.	D.	E.	F.	Group.
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
LIGHT BREEDS.							
G. W. Hindes	2 1	1 3	2	2	2	2 1	2
O. K. P. Farm	2 1	2 3	2 1	1 7	2 2	2 2	2
Range P. Farm	1 1	1 1	1 1	2 2	1 1	2 2	2
L. G. Innes	2	2	2	2	2	2	2
Geo. Prince	1 3	1 3	1 1	1 1	2 2	1 1	1 1
C. Knoblauch	2	2	2	2	2	2	2
Oakland P. Farm	2 1	2	2	2	2	2	2
E. A. Smith	2 1	2	1 1	2	2	1 1	2
G. Howard..	2	2	2	2	2	2	2
T. Fanning	2	2	1 1	2	2	2	2
R. Holmes..	2	2	1	2	2	2	2
T. B. Hawkins	2	2	2	2	1 1	2	2
G. H. Turner	2	2	2	1 1	1 1	2	2
Mrs. Henderson	3 3	2	2 1	2	1 1	2	2
J. H. Wright	2	2	2	2	2	2	2
C. Porter ..	2 1	1 1	2	2	2	2	2
C. P. Buchanan	2 1	2	2	2	2	1 1	2
J. W. Newton	2 1	2	2	2	2	2	2
Dixie Egg Plant	1 1	1 1	1 1	1 1	1 1	1 1	1 1
J. Zahl ..	2 1	2	2	2	2	2	2
Mrs. R. Hunter	2	1 1	2	2	1 1	2	2
W. Becker ..	2	2	2	1 1	2	2	2
E. Chester ..	1 1	1 1	2	2	1 1	1 1	1 1
Quinn's Post R.F.	1 1	1 1	1 3	2	1 1	1 1	1 1
Mrs. Coomber	2	2	2	2	2	2	2
Thos. Taylor	2	2	2	2	2	2	2
J. M. Manson	1 1	2	2	1 1	2	1 1	2
Dr. Jennings	2	2	2	1 1	2	2	2
W. Lyell ..	1	2	1 3	1	2	1 3	1 3
HEAVY BREEDS.							
J. W. Macrae	2 1	2	2	2	1 3	1 1	2
W. Smith ..	1 1	2 1	2	2	2	1 1	1 1
F. A. Claussen	1 1	1 1	2	2	2 1	1 1	1 1
W. H. Reilly	1 1	1 1	1 1	1 1	1 1	1 1	1 1
E. F. Dennis	1 1	1 1	1 1	2	1 1	2	1 1
Mars P. Farm	1 1	1 1	1 1	1 1	1 1	1 1	1 1
A. E. Walters	1 1	1 1	1 1	1 1	1 1	1 1	1 1
E. Morris ..	2	2	1 3	1 3	1 3	1 1	1 1
R. Burns ..	1 1	1 1	1 1	2	2	1 1	2
D. Fulton..	1 1	1 1	1 1	1 1	1 1	2	1 1
Nobby P. Farm	1 1	1	1	1	1	1	1

GROUP PENS.

	Average.	Variation.
LIGHT BREEDS.		
H. F. Britten	2 cz.	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ cz.
G. Williams	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ "
A. W. Walker	2 $\frac{1}{8}$ "	1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ "
Harold Fraser	1 $\frac{7}{8}$ "	1 $\frac{3}{4}$ to 2 "
W. A. Wilson	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ "
S. Wilkinson	1 $\frac{7}{8}$ "	1 $\frac{3}{4}$ to 2 "
Mrs. Anderson	1 $\frac{7}{8}$ "	1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ "
B. Chester	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ "
Geo. Trapp	2 "	1 $\frac{7}{8}$ to 2 $\frac{1}{4}$ "
R. T. G. Carey	1 $\frac{3}{4}$ "	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ "
O. J. W. Whitman	1 $\frac{7}{8}$ "	1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ "
B. Caswell	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ "
P. Oldham	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ "
J. J. Davies	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ "
Shaw and Stevenson	2 "	1 $\frac{7}{8}$ to 2 $\frac{1}{4}$ "
H. B. Stevens	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ "
Mrs. A. G. Kurth	2 $\frac{1}{8}$ "	1 $\frac{3}{4}$ to 2 $\frac{3}{8}$ "
Progressive P. Pens	2 $\frac{1}{8}$ "	2 to 2 $\frac{3}{8}$ "

HEAVY BREEDS.

E. H. Larsen	1 $\frac{7}{8}$ cz.	1 $\frac{3}{4}$ to 2 "
J. Fitzpatrick	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ "
T. Hindley	1 $\frac{7}{8}$ "	1 $\frac{3}{4}$ to 2 "
H. Puff	2 "	1 $\frac{3}{4}$ to 2 $\frac{3}{8}$ "
W. J. Mee	1 $\frac{3}{4}$ "	*
A. Shanks	1 $\frac{3}{4}$ "	1 $\frac{5}{8}$ to 2 "
T. W. Lutze	1 $\frac{7}{8}$ "	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ "

* Not sufficient eggs to secure fair average.

QUEENSLAND AGRICULTURAL COLLEGE.

POULTRY CONFERENCE.

The second annual conference of poultrymen was held at the Gatton Agricultural College on Wednesday, 21st August. The morning was spent in inspecting the fowl runs and competition birds, and in the afternoon the conference was held in the gymnasium hall. The Principal of the College (Mr. Cuthbert Potts, B.A.) presided, and supporting him on the platform were the Minister for Agriculture (Hon. W. Lennon) and the Under Secretary of the Department (Mr. E. G. E. Seriven).

Mr. Potts said that he was quite sure they would recognise how pleased he was to see before him such a splendid crowd of representative poultrymen, and to feel that the College was the centre of common interest to poultry fanciers. It was an appropriate place, he felt, at which to hold such a conference. Last year they made a commencement with the annual conferences, somewhat doubtful of what success would be attained, but he had now no doubt that the conference would continue for everlasting. He was pleased to know that they had with them the Minister for Agriculture, and he had much pleasure in introducing him to the conference. (Hear, hear.)

The Minister, who was given a very cordial reception, said that it afforded him considerable pleasure to be there that day. He wanted to remind them that that was the second conference of that nature at the College. The one last year was by way of an experiment, but he was glad to think that the holding of that had done a lot of good to the industry, and that it had acted as an incentive to people throughout the State to take an interest in poultry. That the interest had grown was shown by the fact that the attendance at that (the second) conference had grown to double that which they had last year. He had on the stocks at present a Bill which aimed at solving a somewhat difficult problem—a Bill to provide for the standardisation

of foods for poultry. (Hear, hear.) There were many patent foods on the market, more or less good, but the object of the Bill was to see that, by analysis, the people who bought those foods were getting something which they were buying and paying for; and that they were not buying rubbish. That was a rather difficult matter to solve. At a conference of Ministers of Agriculture, held in Sydney recently, this matter had been brought up by himself, in order to see if anything had been done in the other States in regard thereto. He hoped that Act, which was founded on some of the provisions of measures adopted in other States, would be an improvement on them. He was not free to divulge the nature of the Bill at that juncture. Proceeding, he said that he considered Queensland an ideal place for poultry-raising. They had, in the main, a long and not too oppressive summer, and a moderately short and not too severe a winter. Consequently poultry-raising would not be hampered by so many difficulties as were met with in other parts of the world. He regretted to say, however, that they had in Queensland only a fraction of a fowl to each person in the State. In America, with a population thirteen times as great as ours, they had three fowls to every person. In strong comparison with that was Japan, where they had only one fowl to every three persons. That would give them an idea of the great difference in these countries of the measure in which poultry-raising was gone in for, and would demonstrate the fact that America had shown great progress in the poultry industry. As a matter of fact, America stood to-day as unrivalled in the importance attaching to the industry, and in the profitable nature in which it was carried on. Queensland had yet a lot to learn in regard to the industry. They did not want to see people rushing blindly into an industry before seeing where they were going to end. Queensland was an ideal place for poultry-raising, and he hoped that the rising generation, and the present generation, would be seized with the necessity of going on and improving the industry, and in that connection he hoped they would be influenced by the fanciers already in the business. So that he might not display his ignorance too greatly, he intended to act on a suggestion from the Principal, and content himself with reading for them a few facts prepared for the purpose. "That was the second conference held at the College," continued Mr. Lennon, "and your deliberations should be of value to your industry and to the State. I understand that the majority of those present are breeders of poultry, and not in a true sense poultry farmers. I recognise the good work a keen breeder can do, even if he has taken the work up as a hobby, and is only operating in a small way. For, assisted by the various egg-laying competitions, the egg-producing capacity of poultry has shown a steady improvement during the last sixteen years, and it is a remarkably fine performance for Australia that two hens last year—one in Victoria and the other in Queensland—should have laid 335 eggs in 365 days. But perhaps the most important feature indicated by the competitions is that the average yield per hen has steadily improved. At the inception of Australian egg-laying competitions, it was the aim to obtain the 200-egg hen, but since then our aspirations have become greater, and there seems no reason why we should not get the 250-egg hen, or even the 300-egg hen. Careful breeding, then, has produced stock which are efficient and more economical producers. The results of the competitions, however, represent chiefly the success of the breeders. They do not fully reflect the average egg-laying capacity of the flocks of the State. Hence I regret that we have not here represented a greater proportion of poultry farmers—men who are entirely dependent on poultry-raising, and of those farmers who depend on poultry for part of their revenue. Most of you are probably dependent on the selling of settings of eggs and stud birds to cover your expenses and yield a profit. But I would impress on you that the success of the industry depends on the successful marketing of eggs and table poultry. In glancing through the agenda paper, I find several subjects for discussion in connection with the competition, but I do not find these broader issues raised. Yet your success as breeders must depend on the commercial utilisation of your well-bred stock. Eggs, as you are aware, varied in price from about 6d. per dozen to 2s. 5d. per dozen during the past year in the Brisbane market. Again, in the north and out in the western districts eggs have remained consistently high in price. Something should be done to stabilise the price of eggs in the big markets, either through cold storage, egg pulp, or dried eggs, while it would appear possible to develop the possible market for eggs in the north and west." The Minister added that he hoped that eventually accommodation would be made in the cold storage buildings, to be erected in Brisbane, for eggs. Proceeding, he said, "There is another section of the poultry work which remains to be developed—this is the table poultry. This year the College exhibited a very fine collection of cross-bred and pure-bred capons, cockerels, and hens at the Exhibition. It would seem that much could be done to develop the table poultry market for the purpose of absorbing the surplus cockerels of the year's hatch as capons. Whether an overseas trade can be developed later remains to be seen. Since you were here last year, considerable development has taken place at the College poultry farm. To supply poultry for repatriation purposes more equipment was required, and, as a result, you saw to-day

the breeding pens, incubator house, and brooders which have recently been erected. Further, to meet the demands of the competition, another 120 single pens have been completed this year. All these buildings have been placed on a new site, well chosen for aspect and drainage, and at present work is in progress transferring the old yards and houses to the new site. In this work an endeavour has been made to lay out the buildings on a model plan, and in this I trust we have been successful. He felt sure they all appreciated the work done by Mr. Potts in modernising the pens. They would see how he had placed them facing the rising sun—than which they had no better purifier. The pens seemed to him to be as perfect as it was possible to make them, and were in striking comparison to the old ones. On this improvement he thought the present Principal was to be congratulated. He thought also that the Government, and even the Minister, was to be congratulated on this state of affairs, because no matter how skilful, earnest, or expert the Principal might be, unless he had a sympathetic Minister and a sympathetic Government to make the money forthcoming, he could not do very much. He (Mr. Lennon) was only sorry that he could not do more to assist them. He would conclude by expressing the hope that they would not only enjoy themselves, but would benefit by the trip to the College, and that their deliberations would assist in developing and bringing forward much more rapidly the great poultry industry in this State of Queensland. (Loud applause.)

Mr. Potts said that since he had been in Queensland he had endeavoured to do a great deal, but he had never attempted to do anything without having the sympathy of the Minister. He called for cheers for Mr. Lennon, which were heartily given.

Mr. A. Harwood (Poultry Instructor) said he had been asked to speak upon the question of table poultry, but would preface his remarks with a few words on feeding, &c. He said he was often asked the question by competitors "How is it that my birds are not doing so well at the College as they are doing at home?" There were several reasons he could give for that. The first related to pens. The system adopted at the College was practically free range. Birds taken from intensive or semi-intensive pens would have a certain set-back when changed straight away when they came to the College. At first they had had ideal weather, which gave them a good chance to get quickly off, but when the westerlies came, those birds used to intensive penning stood no chance of keeping up with the birds which had had no coddling. The former birds, when encountering the westerlies, seemed to tuck up, and go off their food and break into adult moults. That was one of the worst troubles which they had. The question of feeding was another important item. The feeding method adopted was published in the annual report. On the commencement of the competition he did not give the birds a full percentage of blood. If he was to give them the full complement of blood at the commencement of the competition he would have trouble galore—mostly howel troubles. He usually gave them a 3 per cent. ration, and gradually increased it. Putting those birds used to grain on to a concentrated food was going to upset them. He started on the small percentage and worked up. The type question was one which was going to cause a good deal of unrest amongst the competitors for two or three reasons. One was the question of utility birds, which he held must be standardised. If this were done, practically every pen of birds in the present competition would be passed through. They were endeavouring to improve the standard of the birds, and by adopting the present standard he did not think that they were doing any injustice. In connection with housing and feeding, if they all made a note of what he said about this, he thought they would have a better start for next year's competition. He went on to refer to the climatic conditions in Queensland for the raising of poultry, and said that he had reared poultry in the mountains of Derbyshire, in the south of England, and in Queensland, but give him Queensland every time. He thought of the long hours he spent here with the birds and the chickens, but in contrast to that he thought of the trouble and the overtime spent in the old country. There was, for instance, the vaselining of the combs—something which they did not have to contend with in this country. He had been in Australia eight years, and he thought he was now capable of forming an opinion of the lot of the breeders here and in England. In the poultry literature published in this country he noticed a lot of quibbling. This was a grave mistake, and was in distinct contrast to the course followed in America, where the poultry journals were full of interesting information. So long as they pulled against each other they would never come to a satisfactory basis. Here it seemed to be, that everyone considered he was above his neighbour, and made pretensions to know more about his business than his neighbour. That was the gravest mistake they ever made. Since he had come to Australia he had seen a tremendous leap forward made by the industry, but he hoped to see still greater strides. To do it they must all work together. If they did that, he was sure they would meet with success and get good results.

Proceeding to deal with the question of table poultry, he said that this branch of the industry was practically unknown here. He could not see any reason why table poultry should not eventually be of great commercial value to this State. Con-

trasting the way table poultry were sold here with that in Great Britain was enough to make one smile. Here the birds were sold so much per head, whilst in England the sale was by weight of the birds. Was the system of buying by what they could see, as followed here, fair to the man who paid great attention to his feeding? The breeder who bred the birds was worth considering. Should he not have more consideration than the person who only fattened? It was about time that they adopted the practice of selling by weight—so much per pound. When they did that, they were going to make a good start with this branch of the business. His home was on the Sussex border, where practically every farm was a fattening establishment. It was not their purpose to feed for muscle in this feeding process. The coops stood on legs about 3 feet from the ground, and in these, six birds were placed. The birds had no exercise whatever. To protect them from the wind, they placed 6-inch saplings about 7 feet out of the ground. Wire-netting was placed on either side of this, and litter of any kind was used as a breakwind. The "higgler" was a man who went round the district and collected the birds from the farmers. The price would vary considerably. Each higgler had his own customers. The cart he used was a flat-topped affair with no sides, with crates standing on top. It was not an uncommon sight to see a higgler's cart going along with one or two hundred birds hanging out through the bars. The birds which were selected were those which had no pin feathers. They were kept in close confinement for over three weeks, during which time they naturally put on considerable weight; but the majority of the weight was put on during the last week. The feeding for the first ten days was trough feeding. No water was supplied to the birds, all the moisture being derived from the feed. No food was left in front of the birds; all they had to do was to browse and put on fat. Another essential was to be sure that the birds had no lice on them. It was no use whatever feeding a bird which had lice on it. Fatteners would reject these birds until they were clean. In the fattening process they had what they called a crammer—a "blow out" machine. To cram properly, it was necessary to get the pipe right down the bird's neck. Without cramming they could not put on weight in the old country. The heat would perhaps be too oppressive to do that here. But the best form of feeding was to put the birds in an isolated place with plenty of feed and water. The question of dealing with the cockerel must engage their attention. In America these birds were turned into a rich commercial article. It seemed a wanton waste to him to follow the system in vogue here, of screwing their necks and feeding them to the other birds. He suggested that they should form a committee for the purpose of threshing out the table poultry question. If they went on with the present system one saw here, and sold the birds anyhow, the market would be a loss to everyone, and would be very discouraging to those engaged in the industry. They had to go on and not stop in the task. Wherever he could render any assistance in that forward movement he would be only too happy to do so. In connection with the marketing of the birds, the practice here seemed to be to scald the birds. Such a system in the old country would not be looked at, where the poultry were dry-plucked. He instanced the fact that at the Exhibition he had been requested on Wednesday to remove birds which had been scalded on the Monday, whilst others which had been dealt with by the process of dry-plucking were sold on the following Saturday. The latter birds were purchased by a person who he knew appreciated good table birds. In America a certain amount of scalding was done. In the old country the birds were brought in by the fatterer, dry-plucked, and the women did the stuffing. A person with a little bit of practice would soon become proficient in getting the feathers off quickly. The regular pluckers got to know in which way the feathers came off—there was a way in which the feathers left the birds much easier than another. The feathers were a side line which they made a good deal out of. A price of 2d. per dozen was paid for removing pin feathers in England. In Australia they did not pay attention as to the time when they should kill the birds; so long as they looked nice, that was considered sufficient. In the old country, the feathers on the birds were lifted to see the pin feathers. Having been plucked and the pin feathers removed, the birds were thrown to the person who was doing the singeing. To do this he got some straw, made a long row of the birds to be dealt with, started a fire at one end, and worked automatically. They then went to the shaping man, and eventually were packed up in readiness for sale. The birds, being warm, the flesh would solidify. The packing was done in open crates with straw, but he was afraid that this would not do here in this climate. In England they did not glut the one market; they had markets all over the country, and they worked systematically on those markets, and so got the wider field of buyers. The Sussex people, by making a particular study of table poultry, got the advantage of the market.

Questions were called for, and Mr. Harwood was asked if he would be in favour of setting out the system of feeding for the competition in the rules relating thereto?

The Principal said that he would undertake to answer the question himself. They did not change the system of feeding, which was published each year in the annual report. If they got the report, that would not entail the inclusion of the

feeding system in the rules of the competition. It was possible for them to get a copy of a pamphlet dealing with last year's competition.

In reply to another question, Mr. Harwood stated that the birds were always marketed with their entrails, because they would keep much better in that way.

Asked how long the birds were starved in connection with the table poultry fattening, Mr. Harwood stated that the length of time was twenty-four hours.

Another questioner asked for information regarding feeding, and Mr. Harwood replied that if he was to deal fully with this question he would keep them there for a week. He took it they were there that day to learn how to improve the industry. In connection with the plucking of birds, he stated that as there was an absence of pluckers here, it would probably be necessary to first go in for the scalding process. He added that an efficient dry-plucker would pluck a couple of dozen birds whilst the other person was getting his water hot. (Laughter.)

A delegate: What price per head would be a payable price to sell birds at?

Mr. Harwood: At the present time the selling of birds, as they stand—per head—I am sure does not pay. It was essential that they should sell them by weight. If they came to an understanding on this matter, then the poultrymen would get what they required, and would be able to command a price for their cockerels.

Mr. Potts (to Mr. Harwood): Will you promise to write a pamphlet on feeding during the year for the "Agricultural Journal?"

Mr. Harwood: Certainly.

Mr. Beard read the following report dealing with his tours:—"It is now twelve months since we last met in conference in this hall, and since that time I have travelled over a large portion of the State from the Southern border to as far north as Herberton. In many of the districts I visited I found the poultry-fancying industry very stagnant. This was due to the want of someone to impart the advice that is required. I came across many large plants being worked by people with scarcely any knowledge of poultry. Yet some of these people are on a good payable proposition, notwithstanding the high prices of poultry food. They were getting good returns for their eggs and surplus stock. Many of the large poultry farmers in the North hold twelve months' contracts for eggs at 1s. 6d. per dozen, whilst others are satisfied to accept the ruling prices, which range from 10d., in the flush of the season, to 2s. 6d. per dozen in the off season. Townsville and Cairns are the chief markets for the disposal of eggs and surplus stock. Mareeba I found to be the most suitable climate in the North for poultry, being located in a dry belt of country. Here one of the largest plants in the North is situated, whilst several small plants are installed. No disease of any kind came under my notice. At Cairns there are no large plants, but I met a number of fanciers there who are most enthusiastic. Since my visit, poultry clubs have been formed in Halifax, Ingham, Innisfail, Babinda, Atherton, Malanda, and Yungaburra. I am afraid poultry will not make much headway, owing to the continuous wet seasons experienced at those places, although there are many small farmers. At Townsville and Charters Towers there are some really live fanciers. In these places some very large plants have been installed. I saw in the Towers the most up-to-date poultry plant in the North. In the Ayr and Proserpine districts there are some large plants; also a lot of small farmers. Some of the yards at Proserpine were meeting with diseases in various forms. Coming back to the South, commencing at Killarney, there is only one large plant, but a fair number of small ones are being utilised. Killarney, although a large farming centre, holds the unique position of not being able to supply its own demands for eggs, the local storekeepers having to obtain supplies from Yangan, where there are several large plants installed, in addition to a good number of small ones, which are making a great success of the undertaking. Warwick has become a very large centre within the last twelve months. Over a dozen large plants have been put down, in addition to a large number of smaller ones. The most flourishing poultry society in the State is established in Warwick. At Allora, Clifton, and Nobby I found large poultry plants. Nobby I call the hot-bed of the State for Black Orpingtons. At Hidden Creek and Doctor's Creek, although I might call them outlandish places, there are some keen fanciers, who have very large plants installed. Toowoomba is another large centre of the industry. Within the last couple of years not only have several large plants been installed, but quite a number of new fanciers have come into the industry. Within the next few years we can look forward to the Downs being very large suppliers of eggs and poultry."

Mr. Potts said that the only questions which had been submitted for consideration were a series sent in by Messrs. D. W. L. Anderson, W. R. Parker, A. E. Walters, M. J. Lyons, Thomas Carpatt, and L. G. Innes. These would be dealt with seriatim. He called upon Mr. Anderson to submit the first suggestion.

Mr. Anderson, in moving the following proposal:—"That a standard for poultry be fixed and published for the next College competition, and a copy of same be printed on the entry form," said that he considered the standardisation of poultry was one which should be taken up by the Gatton College in its competition. For a number of years, in his opinion, the birds, and especially the White Leghorns, had been rather deteriorating, so far as standard was concerned. If the birds competed up to a standard laid down, giving a larger number of eggs and a greater amount of flesh, he thought the poultry industry would be greatly benefited. If they continued to breed a laying machine it was almost certain that the weight of the egg would deteriorate. That, he thought, could be shown by the chart they had in connection with the competition. As to the standard set out by the National Utility Club, he was not in favour of every item contained therein. That was agreed upon by the Utility Club's conference of delegates throughout the Commonwealth. These they were trying to have embodied into other competitions. He argued that Orpingtons and Silver-laced Wyandottes had also deteriorated in point of standard. He agreed with Mr. Harwood as to the standard, which he thought would bring birds back, not only to flesh-producers, but also to egg-producers. He considered that the standard, with a few modifications, laid down by Mr. Harwood, would be suitable. To obviate the birds deteriorating, he considered that they should take the matter up.

In supporting the proposal Mr. Innes said that the reason he would like the standard set out in the schedule was that every breeder might have a correct idea as to what birds he should pick. He had been a competitor for two years, but had never known what standard the birds were picked from.

Another delegate expressed the opinion that it would be wise for the College not to adopt this standard, because he considered it would not act to the benefit of the competition.

Mr. Finlayson said he thought they had a standard now which was moderately fair.

Mr. Evans asked if it would not be feasible, as was done in the case of cattle, to have a line of demarcation? They could have a standard for utility poultry, and a distinct standard for meat poultry, as in the cattle classes. He was prepared to say that they could not breed meat and eggs at the same time. They would come to a minimum point of success if they attempted to do that. He certainly thought that with such a man as their poultry expert, they could easily form a standard for utility birds, as against meat birds.

Mr. M. Elms said that he was present in Sydney when the standard which had been referred to had been drawn up. The decision really was the outcome of a conference on the whole of the standard breeds recognised in New South Wales and other parts of the Commonwealth. The object was to endeavour to reach a standard for utility poultry. As for the birds deteriorating, he held that the results of the Hawkesbury competition showed that that was not the case. The expert there (Mr. Adlington) (?) stated that this had not had a detrimental effect, but that the standard agreed upon had increased the stamina of the birds and the weight of the eggs. It was very noticeable, in going over the records of the Hawkesbury College, that there were very few eggs under the standard weight. In Queensland they had to admit that they could not say the same thing. In respect to the standard of the birds, they did not have the stamina they should. Of what use, then, for market purposes, were they if they were going on with that. Their birds must have the utility qualification. The keen man in the poultry industry had sufficient judgment to pick out those birds which were going to do him justice in a competition, barring accidents. In forming those standards the consensus of opinion was that it would give the poultryman something to work on, as it was desirable to see how it would work in improving the standard, so that eventually they could evolve something which would be of advantage to the whole of the country."

Mr. Wallace raised the question as to what utility was. He said that so long as the shape of the bird was not incompatible with the greatest usefulness, what was to be gained? A person had to find a breeder on whom he could rely, and to be assured that the type was correct. If he had to start afresh and work until he found the breeder on whom reliance could be placed, and who had the type he was looking for, he was going to be put to a great deal of trouble. In England they had their own shapes and types, and all had magnificent profundity. This also applied in America. If they had their types in these countries, would Australian type-breeders have to start afresh? The industry was coming on by leaps and bounds, but it was still young, and the breeders were inexperienced. They must remember that one had to walk before he could run. In introducing new blood to improve his type, he ran a big risk of breaking up his strain, which he had probably spent years to build up.

Mr. Hindes said that he felt very keenly on this question. He did not think that there were any poultrymen there that day who would have the temerity to say that some of the birds shown as Black Orpingtons had any possible chance of being considered Black Orpingtons. (Hear, hear!) The same thing might be said, in moderation, of some of the Leghorns. If they got away from shape, &c., they lost the type. Some years ago he had sounded a note of warning in respect to this matter. He had observed that the trend of the Black Orpingtons indicated that they were going to pieces. There was many a bird now shown as a Black Orpington which was scarcely as big as a Leghorn. He thought that something should be done in the matter of preserving these good old birds. Leghorns were admittedly a laying type; they had been bred for generations for egg-production alone. Then why try to spoil their good useful birds? They could not get the two extremes in the one bird. They must be satisfied with a first-class layer, a table bird, or a generally useful bird. Why not standardise and keep them to their proper place and breed—*i.e.*, general purpose fowls, layers, or table birds, as the case might be? They had got special prizes for typical birds—birds approaching the standard—why not apply the motion before the conference to that particular section for the next competition, and let those special prizes apply only to typical birds or birds approaching the utility standard mentioned there? This very nearly approached the poultry club of England's standard, with the exception of some details. This, he considered, would be a step in the right direction.

Mr. Immes said that the trouble he wanted to get over was this: Mr. Harwood picked the birds for the type prizes; there was a standard in the competition at the College to-day, but it was hard for a breeder to breed to the poultry standard competition of England and here, and in other parts of the Commonwealth. All he wanted to know was, on what standard Mr. Harwood was going to pick next year's birds. He had been a competitor for the past two years; he picked his birds, but he did not know really what he had to pick.

Mr. Harwood said that the competitions were run purely for utility purposes—it was a question of egg-production. The utility clubs throughout Australia had drawn up a standard, but that was very vague. No one standard helped a person if he had to judge every breed. It was rather a peculiar thing that the most typical pen in the whole of the competitions for Leghorns stood second place. If some men could breed birds for eggs and size, then others could do it. They might say that they could not get the number of eggs from typical Black Orpingtons—the thing was to alter the standard. He did not see what was to stop Australia from forming a fresh standard for utility purposes. They did not want to get away from the breed, otherwise they might as well go to mongrelism. If they were going to produce eggs, they had to produce size of eggs; they could not compete with the Asiatics by marketing a small egg. He urged that they should pay attention to the size of the eggs and have a minimum weight.

Mr. Potts said that he was pleased this matter had been brought up. About two years ago they had raised the question that the type of birds was going down, and expressed the opinion that something would have to be done to standardise the birds. They promised certain regulations, and had stipulated a certain weight for the eggs. They called this a 2-oz. egg. He did not intend to alter that. They had offered certain prizes for those birds true to type. Then the question had been raised as to what they meant by that "true to type." The old English standard type of Leghorn and their modern type he did not think were the same; they must vary. Referring to the argument about the line of demarcation in cattle, he said he did not think that the beef Shorthorn cow was ever going to be the same as the milking Shorthorn; but there was no reason why they should not be Shorthorns all the same. Unfortunately they had in their competitions birds entered as Black Orpingtons which showed signs of absolutely improper blood. They allowed to enter the competitions, practically any birds which complied with the utility standard, but for the "true to type" prizes they looked for certain definite conditions to be complied with. He certainly did not want to see Leghorns which were one straight back from head to tail. They could not class these as being on the standard; there must be something conforming to the type. The main idea was to produce proficiency. The competition was not for the benefit of the man who was making money by a few poultry, but for those who were breeding for the distribution of birds throughout the State. He did not think that they should let the birds develop down to nothing. Utility poultry were really a high standard of egg-laying machine. They wanted to develop a superior type as an egg-laying type. If they were going to take some of the old standards, they were going to kill those birds developing into a good egg-laying strain. He would ask the conference if it would appoint two or three gentlemen to consult with Mr. Harwood and himself, to draw up the type considered most suitable for them to adopt. They wanted to be on safe ground, and he thought they should insist on "true to type" prizes, and give them to something above the ordinary utility type.

Upon receiving the assurance from Mr. Potts that he proposed to have that committee appointed, Mr. Anderson agreed to allow his proposal to stand in abeyance.

The second motion on the agenda paper was as follows:—"That the standard be the one adopted by the National Utility Poultry Breeders' Association of Australia." In view of the decision arrived at in the former matter this also was allowed to stand over.

In launching the discussion on the following proposition, "That the conditions under which competitors enter their birds for the competition be modified as to number of settings being reduced to ten," Mr. Potts said that this referred to one of the conditions which they had in their rules, which meant that the competitor had to be in a position to supply 100 settings for distribution to the public. He was being asked to reduce that to ten.

Mr. Innes, in proposing the motion, said that now that there was so much individual mating this was a rather hard condition to comply with.

Mr. Fanning said that some time ago he had supported a proposal to this effect, but he did not intend to again ask that the number be cut down. Even though those rules were enforced he was going to be bold enough to say that there were men in that room, who, although they had signed a declaration that they could fulfil the conditions, were not able to comply with them. They would put birds into the competition when they did not have half-a-dozen birds in their yards at home. He did not think that the College was going to benefit very much if they altered this condition.

Mr. Oldham said he did not think it was advisable to cut down the number. If a man had any quantity of fowls, it would not take him very long to get that number of settings. A reduction, he argued, would be against the man who was depending on poultry for a living, in preference to the person who only had a few fowls in his back yard.

Mr. Arnold said that before a person was allowed to enter the competition he had to sign a declaration that he could supply 100 settings. But the question was whether it was worth any man's while to have 100 settings? Would they be required? And were his birds of any consequence? He was coming into the competition to improve his connection, and if his birds had done well, he could rest assured that his name was made. He wanted to be successful in the competition so that he would be qualified to have 100 settings to sell. He was very much in favour that the number should come down.

Mr. Finlayson pointed out that the idea of the competition was to encourage breeders to breed birds.

Mr. Potts said that the rules were insisted on, but, unfortunately, they were not always complied with.

Mr. Finlayson said that if the conditions were for 100 settings now, he thought that ten and twenty were too low. He would favour rather a compromise of, say, fifty. Any man who entered birds should be prepared to let the public have the advantage of the competition. Unless a breeder was prepared to let the public have access to his yard, he had no right to have birds in this competition.

Mr. Irvine asked how it was known that the conditions were complied with? He entered fowls for the competition and was never questioned. He supposed that there were a number of competitors who could not comply with the condition. There was no doubt they had many of the competitors who did try to comply with the conditions, whilst others would not care a fig about them. But how did the College know that they were complied with?

Mr. Caswell pointed out that in regard to the quantity of eggs it was not stipulated in what time they were to be produced. He did not think that a man required a great number of birds to be able to supply 100 settings of eggs. The stipulation had to be signed before a justice of the peace, and that should be sufficient to guarantee its genuineness.

Mr. Dennis: Would you request that these eggs should be 2-oz. eggs?

Mr. Potts: There is no stipulation as to the weight of the eggs.

Mr. Newman said that he took it that these competitions were for the purpose of advancing poultry-keeping generally. It appeared to him that if they insisted that an exhibitor should be able to supply 100 settings they were going to block out the small man who was only feeling his way. In course of time the fanciers would get hold of him, and he would become a big fancier himself. He was in favour of the reduction. He took it that the competitions were for the purpose of increasing the number of poultry-keepers. If they insisted on the 100 settings, the small man did not get the desired filip. He thought that it would be wise to remove the restriction to some extent; he would not say how much.

Mr. Harwood said that the competitions were run for the good of the industry, not for a few hobbyists. It was the man with a flock, not for the person with a few fowls in his back yard.

Mr. Potts said that this proviso was put in for the reason that they had not got in Queensland the same organisation which allowed them to know the breeders as well as they did in New South Wales. The declaration, which they asked should be signed before a justice of the peace, was only as a small guarantee. But he regretted to know that some of the exhibitors had deliberately flouted the guarantee. They had signed a declaration which they knew they could not comply with. That being so, the only course left open to him was to disqualify such persons for life. He did not intend to carry out that punishment this year, but if that was continued in, and the provision was violated, he would have no other option. One hundred settings only meant about thirty breeding pullets, and at the outside five or six weeks' layings. If they were not big enough to run those, then they were not big enough to run at the College and take advantage of their prizes. They wanted every man to be keen on poultry, but they did not want them to come there as a sporting competitor to win their prizes. There must be some qualification behind them. He did not think for one moment that they anticipated that he would reduce the number in any way. Rather he would have to make it a great deal more severe if it was not complied with.

Mr. Anderson submitted the fourth proposal. It was, "That the selling of poultry for market be by weight." He pointed out that there were some College birds at the recent Exhibition, and if these birds had been sold by weight it would have given the movement a start off. For some time past he had visited the markets, and he could say that during the last two years the quality of the birds had been on the up-grade. Some two years ago White Leghorns were very weedy as regards weight, but they were coming on now. He had seen them sold for 4s. 6d. per pair, whilst this had now advanced to 7s. 6d. That proved to the poultry-breeder that it was better to breed the improved class of birds. There were times, of course, when the demand for poultry went off. A lot of breeders were under the impression, apparently, that immediately before Easter and Christmas was the ideal time to dispose of their birds, but he had seen these persons send their poultry in to the markets at that time and had fallen in. He thought that they should endeavour to get the Government to realise the advantage of selling by weight. The State Produce Agency could assist them in establishing this system. He thought that the State would find this a very profitable undertaking.

Mr. Irvine said that he thought they were all agreed that the time had arrived when they should dispose of their poultry by weight. The Minister had stated that a measure was likely to be brought before the House, and he thought they should sound the spirit of the meeting, and thus do something to help this movement along. He thought they should endeavour to induce the Minister to have something put in that measure that would compel them to sell their poultry by weight alone. If that were done the breeder who bred the small birds would be the loser, and the public would know just what they were getting.

Mr. Newman said that the difficulty was to tell what the weight was. Sometimes the best-looking birds did not weigh as much as the inferior-looking ones. The great difficulty was as to how they were going to come to the conclusion as to the weight of the birds. They could not weigh the crates and their contents *holus bolus*. In some cases, the birds might be one weight when they left the yard, and another one when they were sold. (Laughter.) The whole question, so far as he could see, was how they were going to arrive at the weight. It would be a question for a committee to endeavour to arrive at an easy method of coming somewhere near the weight; otherwise the poultry industry was going to suffer in the future.

Mr. Pacey expressed the opinion that the people of Australia were not yet educated to poultry-eating. He thought this was a question which they could not go on with that day. Till Australians were educated up to eating poultry, this was a matter best left alone.

Mr. Oldham said that some of the fowls sold on the market at 4s., 5s., and 6s. did not weigh a quarter of a pound when they were taken home. They wanted to give the public a share of what they were making, and they could do that by selling poultry by weight. In America poultry was sold by weight, and they found this a very profitable method.

Mr. Carey said that he had been selling poultry for the last twenty years, and his advice to breeders was to get the best birds. If they did that they would get the best prices. His opinion was that birds should be sold by weight.

Mr. Potts said that it was apparent that the conference was not unanimous on this proposal. His opinion was that the system was quite essential if they were going

to give their attention to table poultry. It was possible for them to breed birds running to a high weight, but that those birds should be sold at the same rate as feathered birds was not right.

Mr. Caswell expressed the opinion that the breeders were strong enough themselves without wanting to be nursed by the Government. If they were not unanimous on this question, the one lot would go one way and the other the opposite. But they sold claff and other varieties of produce by weight, then why not poultry?

Without having come to a decision, the conference proceeded to deal with the fifth item on the agenda paper. This was—"That poultry inspectors for diseases among poultry be educated for that purpose."

Mr. Anderson initiated the discussion. He said that his reason for mentioning this matter was this: There were many persons at the present time advocating that experts in diseases of poultry should be appointed, considering themselves experts of all diseases which poultry suffered from. He understood that Mr. Lennon was bringing forward a Bill, and he thought that it should be a recommendation to him that this matter should be included therein and brought under the Stock Acts. Further, he advocated that poultry experts appointed relative to diseases in poultry should pass an examination, to comply with the Stock Diseases Act. He also thought that it would be a wise scheme for the soldiers passing through the College to follow up this branch of the industry minutely, with the object of sitting for the examination thereon. The Minister had said that nothing could be done this session on this matter, but that it was proposed to bring it forward next parliamentary session. He (the speaker) thought that it would be a good thing to make a start in the matter now. In following out the suggestion, he thought they would get competent men appointed. As a recommendation, he suggested that the Minister should be asked to bring this under the Stock Act, and that every poultry diseases expert should pass an examination of some sort for that purpose. (Hear, hear!)

Mr. Potts said that Mr. Anderson had brought forward a matter which was of considerable importance. The only method by which they knew that the persons appointed to carry out the work of inspection were competent was by the conducting of an examination. He thought they could quite safely recommend this matter for consideration, but it would probably come better from the various clubs and not from the conference. However, he could assure them that it would be somewhat difficult to comply with the request. A great many of their poultrymen were men who had grown up in a practical school, and knew the local requirements. They would have to fall back on those sound practical men, and gradually it would be possible for a proper examination of inspectors. However, he did not think that they should put this matter through the conference that day.

In connection with the sixth matter on the paper—"That an inspection committee be appointed for the competition"—Mr. Potts said that he thought he could not let them discuss that matter at the conference, but he was going to take it as a recommendation, because he was in favour of having an advisory committee to assist them in running the competition. He had on one occasion brought the matter before the Minister and the Under Secretary, and they were half-heartedly in favour of it. It was thought that it would not be right for the running of the competitions to be taken out of their hands, but an advisory committee could do an enormous amount of work, by not having executive powers. He proposed to have such a committee appointed.

Mr. Innes brought forward a suggestion for the numbering of leg-bands on competition birds, suggesting that they should be numbered consecutively from, say, 1 to 6, and so on. This would assist the College officials, he thought, in taking the birds from the coops.

Mr. Potts said that this was only a small detail, but it was a very useful suggestion. Competitors were often very careless of the manner in which they sent along their pens, and they only wanted to be at the College when the pens were arriving to realise how much trouble that carelessness led to. He thought they might all follow out the suggestion. If they were to use consecutive numbers it would be decidedly better for them.

In connection with a suggestion regarding reserved carriages being made available for the use of the delegates, Mr. Potts said that now that the success of the conferences had been assured, they would be able to look after these details. He did not see why they should not have a special train.

A delegate asked if it would be possible to issue weekly reports in connection with the competition, and, in reply, Mr. Potts said that they did not have the staff at the College necessary to do this. Not many of them seemed to realise the amount of work which the preparation of these reports involved. They did not quite get the support from the Press in Queensland which they did in the South.

This concluded the discussions, and the conference closed with a hearty vote of thanks to Mr. Potts.

Viticulture.

PRACTICAL HINTS ON ESTABLISHING A VINEYARD.—No. 5.

By P. MAHONEY.

MANURING.

Although the soil may be rich enough to grow and produce satisfactory crops, the money spent in manuring the vine in rich soil is returned twofold, providing it is given judiciously—that is, supplying those constituents in which the soil is deficient. To do this a person should know the constitution of his soil. Most soils, rich as they may appear to be, are very often deficient in some kind of plant-food, and if that deficiency be not made up artificially the plant cannot produce to its limit. Even though the soil may be rich enough to grow and produce heavy crops, it should be maintained in that condition by light dressings of artificial manures. If manuring is practised from the commencement, the soil never becomes weakened in plant-food, but retains, and perhaps improves, the supply, which should be the aim of the successful man.

In the event of no manures being used for a number of years, the dressings will have to be heavy to keep up the supply of food, for during those years large quantities of food have been utilised by the vines, and there may be doubts about its ever again reaching its original and required fertility. For, if the vine has borne heavy crops, the utilisation of the plant-food would have been great.

If light manuring is practised from the commencement of the time of planting the vine, it would not prove as expensive as heavy manurings later on, and the crops would be more regular in time of fruiting and in quality.

The point in making a success of grapegrowing, as in anything else, is not to wait until the soil has become deficient in plant-food before supplying it, but to have a good supply ever ready for the plants. If such conditions are complied with, only half the quantity of land or perhaps less need be used to equal the results from unmanured land, thus saving enough working expenses to pay for manure.

The foods required for the upkeep of the vine and production of crops are phosphoric acid, potash, and nitrogen, all of which can be supplied artificially, although supplies of potash cannot be obtained now, owing to war conditions. These dressings—viz., 2 cwt. of superphosphate, 1 cwt. of sulphate of potash, and $\frac{1}{2}$ cwt. of nitrate of soda—when sown in the bottom of a furrow at the spring ploughing, have been proved to give the best results. Green manuring, such as the ploughing-in of field peas or tick bean, which are the best nitrogen-producers, are also highly beneficial in keeping heavy soils open and friable, as well as in producing nitrogen.

It is not always advisable to practise green manuring. For instance: If the spring rains are not too reliable, and the moisture being taken out of the ground by the peas or beans, these factors will have a tendency to retard the starting of the vine in spring time, and thus to prolong the time of ripening of the fruit, whereas it is important to have the fruit off before the wet season sets in, in which case the damage would be considerable if the fruit happened to be ripening up; and for table grapes, the earlier they are the higher price they realise. Therefore, my contention is, that nitrogen supplied artificially is much preferable to green manuring under such circumstances.

Where irrigation is installed, green manuring can be resorted to with advantage. The best method of ploughing-in green manure is to chop it up with the disc cultivator, by which means it is possible to cover every particle of the manure satisfactorily, and afford a thorough cultivation. Lime is beneficial in any soils, more especially in heavy soils, for it keeps it open and friable, thus making it easy to work, and consequently increasing its power of retaining the moisture for a longer period. It also makes food in the soil available for the plant, through its action upon the soil.

Light dressings at short intervals are better than heavy ones at long intervals.

[TO BE CONTINUED.]

SOUTHERN FRUIT MARKETS.

Article.	SEPTEMBER.	
	Prices.	
Bananas (Queensland), per case	10s. to 16s.	
Bananas (Tweed River), per case	14s. to 28s.	
Bananas (Fiji), per case	22s. to 23s.	
Bananas (G.M.), per bunch	10s. to 14s.	
Bananas (G.M.), per case	22s. to 23s.	
Lemons (local), per bushel-case	4s. to 7s.	
Mandarins, per bushel-case	7s. to 11s.	
Oranges (Navel), per case	6s. to 12s.	
Oranges (Other), per case... ..	8s. to 9s. 6d.	
Oranges (Queensland), per case	8s. to 10s.	
Papaw Apples, (Queensland), per double-case	12s.	
Passion Fruit, per half-case	10s. to 20s.	
Pears, per bushel case ... ..	...
Pineapples (Queens), per double-case	8s. to 11s.	
Pineapples (Ripleys), per double-case	6s. to 8s.	
Pineapples (Common), per double-case ... ..	...
Tomatoes (Queensland), per half-case	2s. to 6s.	

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	SEPTEMBER.	
	Prices.	
Apples, Eating, per case	8s. 6d. to 15s.	
Apples, Cooking, per case	11s. to 12s.	
Bananas (Cavendish), per dozen	2½d. to 6½d.	
Bananas (Sugar), per dozen	2d. to 3½d.	
Cape Gooseberries, per half bushel-case	12s. to 14s.	
Citrons, per hundredweight	16s.	
Cocconuts, per sack	15s. to 25s.	
Cumquats, per quarter-case ... ..	...
Custard Apples, per quarter-case	2s. 6d. to 5s.	
Lemons (Lisbon), per case... ..	4s. to 10s.	
Mandarins, per case	3s. 6d. to 16s.	
Oranges (Navel), per case	5s. to 13s.	
Oranges (Seville), per hundredweight	14s.	
Oranges (Other), per case	4s. to 8s.	
Papaw Apples, per quarter-case	1s. to 3s. 6d.	
Passion Fruit, per half bushel-case	7s. to 13s. 3d.	
Peanuts, per lb.	5d. to 9d.	
Pineapples (Ripley), per dozen	6d. to 2s. 6d.	
Pineapples (Rough), per dozen	6d. to 2s. 3d.	
Pineapples (Smooth), per dozen	1s. to 3s.	
Rosellas, per sugar bag ... ..	...
Strawberries, per dozen boxes	8s. to 15s.	
Tomatoes, per quarter-case	9s. to 11s.	

TOP PRICES, ENOGGERA YARDS, AUGUST, 1918.

Animal.	AUGUST.	
	Prices.	
Bullocks	£26 to £29 2s. 6d.	
Cows	£13 10s. to £18 17s. 6d.	
Merino Wethers	46s.	
Crossbred Wethers	41s. 6d.	
Merino Ewes	34s. 3d.	
Crossbred Ewes ... ..	...
Lambs	34s. 3d.	
Pigs (Bacon)	91s.	
Pigs (Porkers)	56s. 6d.	

EXHIBITION SALES.

Animal.	AUGUST.	
	Prices.	
Bullocks	£31 15s.	
Bullocks (Champion)	£37 15s.	
Bullocks (Guessing)	£31 10s.	
Cows	£24 10s.	
Cows (Champion)	£23 15s.	
Merino Wethers	48s.	
Crossbred Wethers	74s.	
Crossbred Lambs	55s.	

THE DEEPEST BORE IN AUSTRALIA.

Mr. J. H. Hart, owner of Springleigh Station, in the Blackall district, has (says the "Pastoral Review") struck a flow of 250,000 gallons of water in a bore sunk to 6,000 feet, which is claimed to be the deepest bore in Australia. It took four years to put down. The bore struck a flow of 80,000 gallons at 4,000 feet, but boring was continued, and the water is now flowing 1 foot over casing, and increasing. The cost as the bore got deeper was very great, being up to £4 7s. 6d. per foot latterly for boring, and 12s. 6d. for casing. The temperature of the water is 198 degrees.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF AUGUST, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING AUGUST, 1917 AND 1918, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Aug.	No. of Years' Records.	Aug., 1918.	Aug., 1917.		Aug.	No. of Years' Records.	Aug., 1918.	Aug., 1917.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
Atherton ...	In. 0.91	17	In. 1.51	1.70	Nambour ...	In. 2.03	22	In. 4.27	2.28
Cairns ...	1.88	36	2.34	3.12	Nanango ...	1.47	36	1.78	0.79
Cardwell ...	1.29	46	2.05	1.28	Rockhampton ...	1.04	31	0.45	3.41
Cooktown ...	1.43	42	1.99	0.79	Woodford ...	2.00	31	1.68	1.34
Herberton ...	0.67	31	1.17	1.44					
Ingham ...	1.40	26	3.22	1.73					
Innisfail ...	5.52	37	7.23	16.82					
Mossman ...	1.42	10	...	1.26					
Townsville ...	0.45	47	1.27	2.07					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
Ayr ...	0.48	31	1.22	3.05	Dalby ...	1.27	48	1.75	1.05
Bowen ...	0.69	47	1.15	3.05	Emu Vale ...	1.25	...	1.85	0.68
Charters Towers ...	0.52	36	0.83	4.03	Jimbour ...	1.33	...	2.16	0.71
Mackay ...	1.06	47	0.89	4.58	Miles ...	1.29	33	1.02	0.78
Proserpine ...	1.12	15	2.27	4.50	Stanthorpe ...	1.93	45	2.53	0.83
St. Lawrence ...	0.91	47	0.53	1.78	Toowoomba ...	1.84	46	1.90	1.89
					Warwick ...	1.55	31	2.32	0.99
<i>South Coast.</i>					<i>Maranoa.</i>				
Biggenden ...	1.27	...	0.82	4.51	Roma ...	0.98	44	1.31	0.89
Bundaberg ...	1.45	35	1.22	1.14					
Brisbane ...	2.23	67	1.24	1.03					
Childers ...	1.30	23	1.35	1.28					
Crohamhurst ...	2.43	25	3.81	3.61					
Esk ...	1.67	31	2.27	0.78					
Gayndah ...	1.27	47	1.90	0.85					
Gympie ...	1.93	48	2.15	1.75					
Glasshouse M'tains	1.81	10	2.06	2.04					
Kilkivan ...	1.63	39	0.98	0.65					
Maryborough ...	1.82	47	1.29	2.35					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	0.93	4	1.65	1.62
					Gatton College ...	1.33	...	1.53	0.82
					Gindie ...	0.82	...	0.15	3.27
					Hermitage ...	1.52	...	1.95	0.82
					Kairi ...	1.11	4	1.53	1.67
					Kamerunga ...	1.56	...	...	2.51
					Sugar Experiment Station, Mackay	0.93	...	...	3.17
					Warren ...	1.13	4	0.90	3.06

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for August this year, and for the same period of 1917, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

BANANA SNAKEBITE CURE.

A Brazilian correspondent writes to an oversea paper as follows:—"I have witnessed some remarkable cures of bites from poisonous snakes while on a trip in the district of the Rio Taquary. One of these was an Indian peon, who was bitten in the foot by a 'Yaraoca' snake. He arrived at the estancia, apparently in the final stages, bleeding from the gums and all swollen up. A drink of banana juice taken from the tree trunk was given him, and in three days he was quite sound. Another case was that of a child who was treated in the same way and recovered. I also saw the case of a bullock which was snake-bitten and seemed to be dying, unable to get up. We made an experiment by forcing it to swallow the juice. The swelling subsided, and next day the bullock was almost sound and able to graze."

[The above remedy was recommended by a Dr. Speisséger in Carolina as far back as 1749. It was discovered by a negro slave, and was said to be infallible. As a reward for his discovery, he was given his freedom and a pension for life. The directions were to crush the roots of the banana (or of horehound), squeeze out the juice, and give, as soon as possible, one large spoonful. An hour later, give another spoonful, which never fails.—Ed. "Q.A.J."]

Orchard Notes for November.

THE SOUTHERN COAST DISTRICTS.

November is somewhat of an off month for fruit, as the crop of strawberries is about over; pineapples, with the exception of a few off season fruit, are not ready for marketing; and citrus fruits of all sorts, with the exception of those grown in the latest districts, are now over. Bananas should, however, be improving, particularly if the season is favourable.

The most important work of the month is the cultivation of the orchard, as, in order to retain moisture in the soil, it is essential that the soil be kept in a fine state of tilth. Where the land is liable to wash, breaks should be left between the fine-worked land, or, even better, a good break of cowpea or other leguminous crop, valuable for producing nitrogen and humus, should be grown. All fruit pests should be attended to; cyaniding can be carried out where necessary, and is especially useful now in the case of the Red, Purple, Mussel, Circular Black, and Glover Scales. Fruit fly should be systematically fought; all infested plums, peaches, guavas, or other fruits should be gathered and destroyed, so as to prevent the spread of the pest. Sucking bugs of all sorts should be gathered and destroyed, the egg-clusters, as well as the immature and mature insects, being destroyed. Hand-gathering is as good a plan as any. Fig beetles should be destroyed by spraying with Kedzie's mixture; and the egg-clusters should be destroyed whenever found.

Bananas and pineapples can be planted during the month, taking care, in the case of the pineapples, not to set out suckers that will immediately throw out a fruit, but those that will become firmly established before they fruit. Examine the vineyard carefully, and keep it well worked. Look out for Oidium and Black Spot, and treat for same as recommended in the Orchard Notes of the two previous months.

Early ripening grapes will be reaching maturity towards the end of the month; but few, if any, will be ripe. In any case do not market too immature fruit; rather wait a few days longer, till it is fit to eat.

THE TROPICAL COAST DISTRICTS.

The main crop of pineapples will ripen during the month; and if gathered at the right time—viz., when fully developed, but not turned colour—they will carry all right South, if carefully handled and well packed. Papaws and granadillas are still in season, and will meet with a good Southern demand; they must be packed in cases containing only a single layer of fruit, and should be sent in the cool chamber. I am certain that a good market can be got for these fruits in both Melbourne and Sydney, particularly at this time of the year, when their winter fruits are off and their summer fruits are not yet on.

Watch bananas carefully for fly. Keep the orchards well cultivated.

Only ship good mangoes South; for too much rubbish is sent to Brisbane. Good mangoes will pay to pack properly, but the common sorts, which predominate to an enormous extent, will barely pay freight, if there is a good crop. The canning of good types of fibreless mangoes of good flavour is well worth taking up commercially in the North, as a ready sale for the canned fruits can be obtained.

As in the Southern Coast districts, all fruit pests should be systematically fought, and the orchard should be kept in a good state of tilth, as, once the wet season starts, there is little chance of cleaning up weeds and rubbish of all kinds, or of cultivating and sweetening the soil.

THE SOUTHERN AND CENTRAL TABLELANDS.

The earlier kinds of summer fruits, such as cherries, will ripen during the month. See that, if fruit fly makes its appearance, it is systematically fought.

Look out for Codling Moth, and continue the spraying with Kedzie's mixture.

Look out carefully for any San José scale that may have escaped the winter spraying, as, if the trees are sprayed whilst the young are hatching out, the bulk of the insects are killed and little damage is done either to tree or fruit.

The sulphide of soda spray is one of the best to use now. Keep Woolly Aphis in check, should it make its appearance, using the resin washes; or, if it and San José scale are both present, use the sulphide of soda spray.

Watch the vineyards carefully for Black Spot and Oidium. Keep the orchard and vineyard well cultivated, so as to retain all the moisture in the soil required for the growth of the tree and development of the fruit. In the warmer parts, irrigate when necessary, following the irrigation by deep and systematic cultivation.

See that grape vines have plenty of foliage to protect the ripening fruit from sun scald, but yet not so dense a foliage as to induce Oidium or Black Spot. Look out for Red Scale on citrus trees, and cyanide to check same. Look out for fruit fly in the early ripening fruits, and gather and destroy all that may be so affected.

Farm and Garden Notes for November.

FIELD.—Under ordinarily favourable conditions, harvesting the wheat and barley crops may now begin. Those who have oats for hay should cut it when the grain has formed, but before it is ripe, for then the plant is in its most nourishing condition. Destroy caterpillars on tobacco plants, and top the latter so as to throw all the strength into the leaves. Keep down the weeds, which will now try to make headway; earth up any growing crops requiring the operation; sow maize, imphoe, setaria, kafir corn, teosinte, sorghum, cotton, &c. Plant sweet potatoes, sisal hemp, yams, peanuts, and ginger.

KITCHEN GARDEN.—Why do so few gardeners and farmers grow their own vegetables? This is a question frequently asked by visitors to the farming districts. The reason probably is, that vegetables require a good deal of care and attention, which means also a good deal of time taken from the ordinary farm work. In many cases it pays the farmer better to buy many kinds of vegetables than to grow them himself. The only vegetables grown on many fine farms are cabbages and pumpkins, not to class potatoes under the head. Many people have an idea that European vegetables cannot be grown during the hot summer months, but this is a great fallacy; the Chinese gardeners supply the towns with all kinds of vegetables, except, perhaps, cauliflowers, during the whole of the summer. It is, therefore, clear that, by constant work, plenty of manure, water, and some shade for seedlings, most vegetables can be produced during the hot months from November to March. If your ground has been trenched or deeply dug and well worked, the advantages will be seen during the coming months. It does not pay to work shallow-dug ground. When sowing and planting during this month, give plenty of room between the rows and the plants; otherwise they will be drawn up and worthless, and keep the ground open by constant forking and hoeing. Thin out melon and cucumber plants. It is a good plan to peg down the vines; they will then not be blown about by the wind; they will take root at intervals, and thus help the main stalk. Give plenty of water to tomatoes planted out last month. They should also be mulched. Sow cabbage, French beans, melons, lettuce, radishes, pumpkins, cucumbers, marrows, rosellas, &c., and transplant for succession in calm, cloudy weather.

FLOWER GARDEN.—Stake any dahlias which may be now above ground, and plant out the bulbs which were stored in a moist place. If the weaker bulbs are reserved, they will come in for autumn planting. Take up all bulbs which have done flowering, and store them in a dry place. Winter-flowering plants will have gone off almost; still, the garden should be in full bloom, and will well repay the trouble bestowed on it, and a little fertiliser given as a top-dressing will assist the plants to bloom and look well for a longer time than if they were neglected. Give weak liquid manure to chrysanthemums, and allow no suckers to grow till the plants have done flowering. Take up narcissi. Do not store them, but plant them at once in new situations. Sow antirrhinum, balsam, zinnia, summer chrysanthemum, callopsis, and nemophila.

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PART 5.

Agriculture.

AMERICAN COTTON INSECT PESTS.

A United States Government Report states that the growing of cotton in the United States continued to be interfered with materially by the ravages of insect pests, particularly of the boll weevil. The efforts of the National and State Governments have failed to find a means of eradicating this pest. However, by seed selection, plant improvement, and better methods of cultivation and fertilisation, it is possible to curtail very materially the damage that may be done by it. Insect pests of various kinds cause great loss to growers of cotton in a number of foreign countries. It has been discovered that the pink bollworm, which causes so much damage to the Egyptian crop, has obtained a footing in Mexico. The devising of measures to prevent its introduction into the United States from that country is one of the problems prominently before the officials of the United States Department of Agriculture and some of the State Bureaus. Rigid quarantine has been established, and regulations are being enforced to prevent its being brought into the country through commercial channels. The following statement indicating the activities of the boll weevil during the past season has been prepared by the Bureau of Entomology and by the Federal Horticultural Board of the Department of Agriculture:—

Cotton Insect Pests in 1916.—The cotton crop in 1916 in general was not seriously injured by insect pests other than the boll weevil, although reports of damage by the bollworm in North Carolina were numerous. The extensive early spread of the weevil in 1915 was followed by a favourable winter and unusual numbers of weevils were found, especially in the southern portions of the cotton belt. The spread during 1916 was normal, not being especially aided by storms or high winds. The weevils continued moving up to the middle of December, and almost a month after frosts had killed the greater part of the cotton. The most important features of the year were the invasion of 31,000 square miles of territory in Georgia and 4,000 square miles in Tennessee, and the spread of the insect practically to the limits of cotton culture in Oklahoma, Arkansas, and Florida.

The territory invaded in 1916 included 71,800 square miles, the second greatest gain ever made by the weevil in a single year. There were no compensating losses of territory. The total area now infested amounts to 480,940 square miles.

The terribly destructive boll weevil has never made its appearance in Queensland, the Agricultural Department having always been careful that any seed imported from America or elsewhere shall be declared clean by the officials in the above countries—whose duty it is to examine all seeds and plants exported.

GINSENG.

PROFITS FROM "FREAK FARMING."

We have received from Messrs. Bunting Bros., of Toolooa, the following interesting extract from the "Scientific American" for March, 1918, on the cultivation of ginseng, a subject on which several articles have appeared in the "Queensland Agricultural Journal." There is no reason why this singular plant should not be grown in Queensland to as much advantage as in the United States. From all accounts there is undoubtedly a steady market for these medicinal roots in China at very high prices, and it may also be that Chinese merchants in the Southern States would be buyers of the roots, which, as will be seen by the following notes on the subject, are highly prized by the Chinese for their medicinal properties. In July last Mr. Thos. Wood, seedsman, George street, Brisbane, imported a quantity of seed from America, and several gardeners here are now experimenting with it.

The accompanying photos. of the shaded ginseng fields, and of the flowers and roots, give a good idea of the methods of growing this plant.



PLATE 24.—FIELD OF GINSENG PLANTS IN THEIR FIRST YEAR'S GROWTH.

"Among the unusual industries in America is the cultivation of ginseng, a species of 'freak farming' as it is called by the orthodox tillers of the soil.

"The root of this plant is the Chinese cure for 'all the ills that flesh is heir to.' We are apt to scoff at the notion that it is valuable as a medicine, believing that its use is a superstition handed down for generations in China. But it never fails to excite interest, perhaps because the Chinese dealers are willing to pay almost 9 dollars per lb. for these precious roots, so that the returns from half an acre of land may be easily 6,000 or 7,000 dollars—that is, if you know how to get results.

"The discovery of the plant on this continent was made over 200 years ago. The demand from China increased yearly. Then such energetic hunting began that the plant was in a fair way to become extinct, as no effort was made to see that reproduction took place, and up to about thirty years ago no one thought of cultivating this valuable root. It was even thought impossible. But a few individuals endowed with an unusual amount of faith and patience took it up as a hobby, experimenting until

they finally were successful. Here are a few of the things they had to learn before the industry was launched.

"The plant reproduces from seed, but the seeds are unusual. They will not germinate until the second season, or about eighteen months after harvesting. During this time they must be watched carefully; they have to be kept moist, but not too wet or they will rot, not too dry or they lose all their vitality. These things had to be learned through failure. One method of caring for the seeds is to stratify them in moist sand, in the following manner:—A box not more than 1 ft. deep is used, with holes bored in the bottom. Then alternate layers of the sand and seed are placed in the box (the sand should be about 1 in. thick); then a layer of berries which may touch each other but must be only a single layer; then another strata of sand which must more than cover the seeds; and so on until the box is filled, allowing at least 3 in. of sand at the top, with a layer of moss to hold moisture. The top and bottom of the box are covered with a wire screen and then buried in a shady place where the water will drain off. It is advisable to put a sloping roof over the box to prevent too much moisture; and care should be taken during summer months to prevent the seed from becoming too dry.



PLATE 25.—GINSENG FIELD IN SEPTEMBER OF FIFTH YEAR, WHEN THE SEEDS ARE RIPE.

"The patience of the ginseng-grower is further tried by the fact that after the seed germinates and the little plants begin to grow it takes five years before the root (which is of greatest importance) is matured sufficiently for use. As it requires such a small area in which to raise a profit-securing quantity, the soil of that area can be worked over and just the right substances added to make the ground suitable for this plant. The growers went direct to the forests and analysed the soil, and claim that almost any sort of ground can be made into proper ginseng soil. That which is most easily prepared is of rather a coarse texture, clay loam mixed with sand, which drains naturally. As the area is small, sand can be added to heavy clay ground to make it porous and mellow.

"The transplanting of the small roots is very important, as is also the digging of the mature roots for the market. At the end of the fifth season's growth the roots are marketable.

After careful digging the roots are washed free from mud, the safest way being to spray them gently with a hose. They are then placed in a warm room with plenty of air. All the fibrous rootlets will become brittle as the ginseng dries. Finally they can be rubbed off without injuring the skin. Roots that are hard command a poor price. A short, stubby root is preferred, rather light in colour, sponge-like to the touch, and light in weight compared to the size. We have been told so often that the

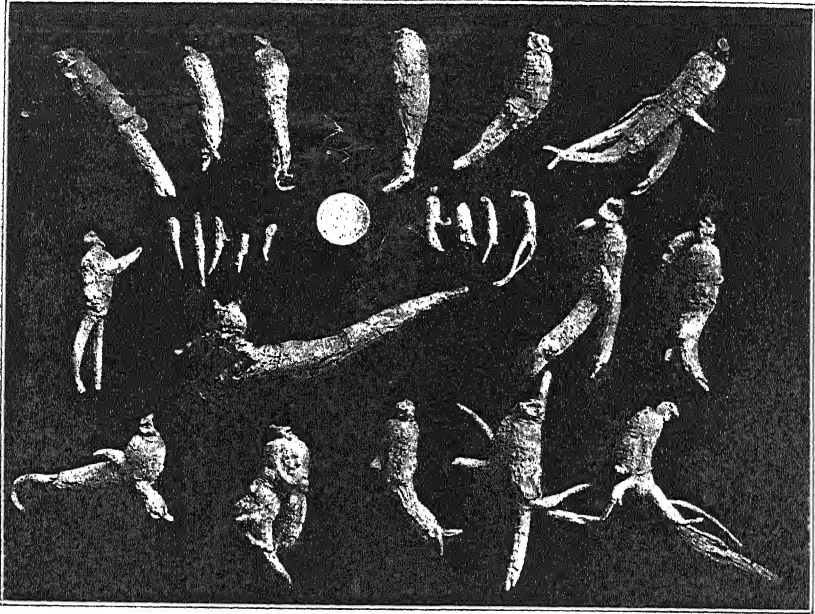


PLATE 26.—A COLLECTION OF GINSENG ROOTS OF TYPICAL SHAPES AND SIZES.
(The medal, the size of a silver dollar, gives a good idea of the size of the roots.)

Chinaman favours the root that most resembles the human form (for these very often produce queer little shapes like manikins) that we have come to believe that their supposed preference is part of the ginseng 'superstition.' But the dealers claim that this is not the case. The short single root is preferred by them. Our own doctors are beginning to think that this is no superstition after all, and that ginseng is of great value medicinally. Experiments are being made continually."

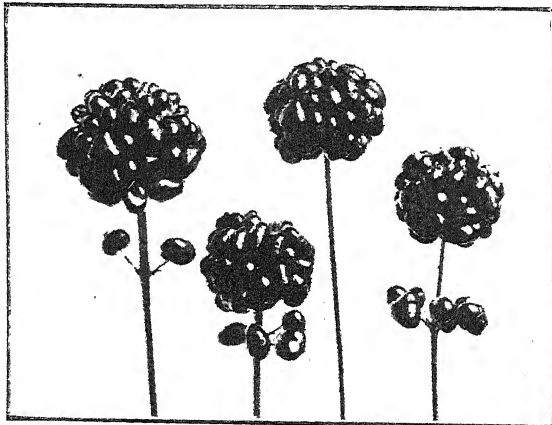


PLATE 27.—MATURED SEED HEADS, THREE-QUARTER SIZE.

LIBERTY MILLET.

In consequence of the action taken in the United States of America deleting all names of enemy origin, the so-called Giant Panicum (*Setaria Italica*) has been renamed "Liberty Millet." Applicants for this seed will please note.

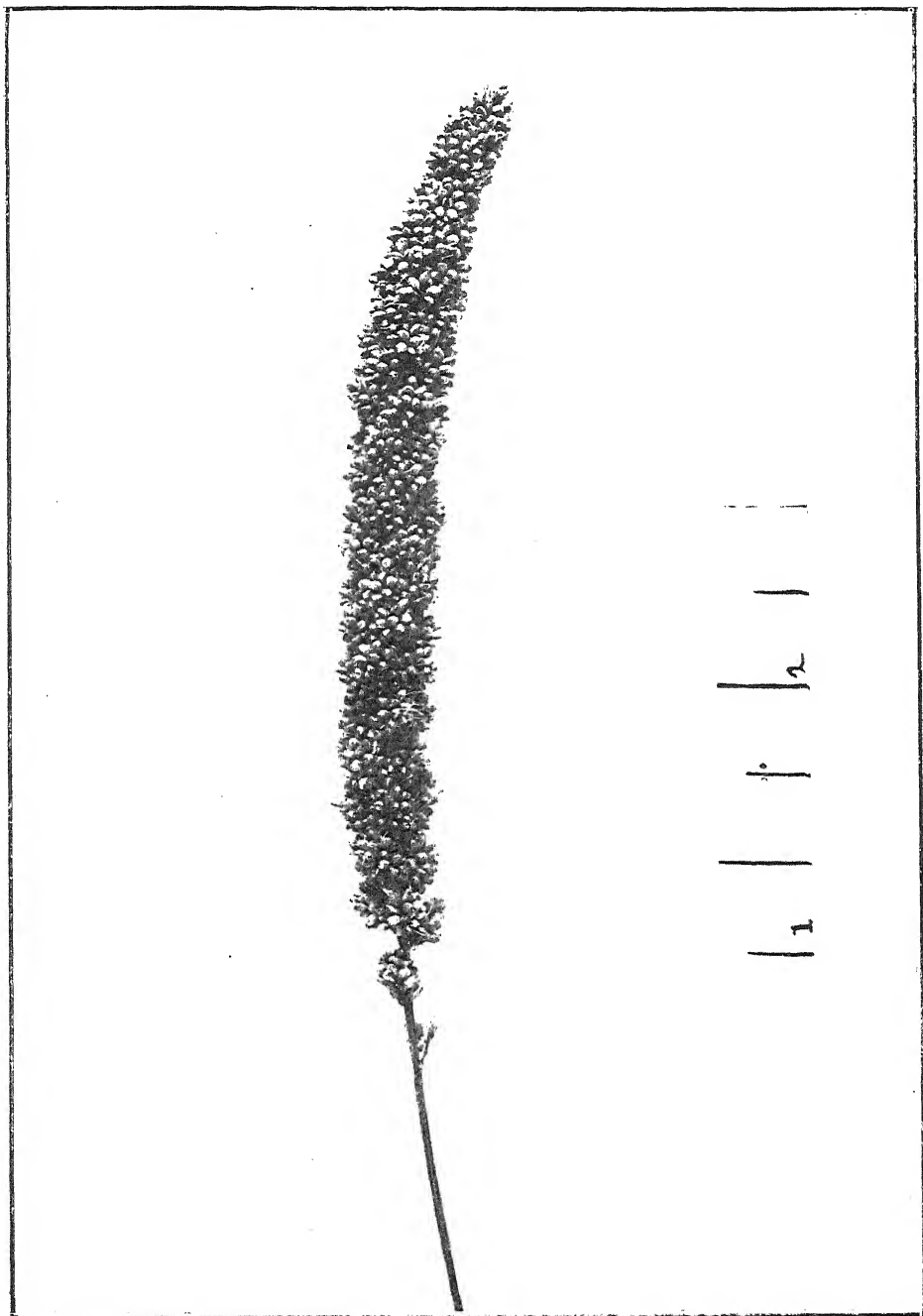


PLATE 28.—LIBERTY MILLET.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Book Societies is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
 The Shorthorn Herd Book of Queensland;
 The Jersey Herd Book of Queensland;
 The Illawarra Herd Book of Queensland;
 The Ayrshire Herd Book of Queensland;
 The Milking Shorthorn Herd Book of Queensland;
 The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS.				
AYRSHIRES.				
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	40	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview," Southbrook	7	34	Do.
JERSEYS.				
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoor	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, <i>via</i> Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
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DAIRY BREEDS—*continued.*

GUERNSEYS.

Queensland Agricultural College	Gatton	2	2	Eligible, but no Guernsey Herd Book of Australia
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HOLSTEINS.

Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman	.. "St. Athan," Wyreema	12	47	Do.
F. G. C. Gratton	.. "Fowlerton," Kingsthorpe	1	15	Do.
R. S. Alexander	.. Glenomond Farm, Coolumboola	1	3	Do.
Ditto	.. Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings	.. St. Gwithian, Toogooloowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff	.. Inavale Stud Farm, Bunjgurgan, Q.	3	9	Do.
E. Swayne	.. West Plane Creek, Mackay	1	2	Do.

ILLAWARRA.

A. Pickels	.. .. Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	.. Corndale, Coolabunia	3	43	Do.
W. T. Savage	.. .. Ramsay	2	22	Do.
Hunt Bros.	.. .. Springdale, Maleny..	3	62	Do.

MILKING SHORTHORNS.

P. Young	.. .. Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	.. .. Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	.. .. Torran's Vale, Lane-field	1	9	Do.
W. Middleton	.. .. Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten	.. "Dunure," Miles ..	2	8	Do.

BEEF BREEDS.

SHORTHORNS.

T. B. Murray-Prior	.. Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall	.. Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan	.. "Arubial," Condamine	3	6	Do.
W. B. Slade	.. E. Glengallan, Warwick	2	20	Do.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
BEEF BREEDS— <i>continued.</i>				
HEREFORD.				
A. J. McConnell ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Do.
Tindal and Son ..	Gunyan, Inglewood	50	400	Do.
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book of England

FARMERS' WOOL CLIPS.

By R. WILSON, Assistant Instructor in Sheep and Wool.

As advertised on another page of this Journal, the Department of Agriculture and Stock will receive and class all farmers' clips from flocks of 1,500 sheep and under.

No lot is too small for consideration, as one bag, or even one fleece, would be classed according to the various grades contained therein.


There has been specially fitted up a new store in William street, and experts are employed to superintend all work in connection with the treatment of farmers' wools consigned to the Department of Agriculture and Stock.

The fittings of the new store include all the necessary bins, tables, woolpress, with plenty of storage room; and the officers of the Department would be pleased to show and explain them to any visiting farmer who may be interested.

Farmers should notify the Under Secretary, Department Agriculture and Stock, the number of bales or bags consigned, and also state whether they will require the usual advance.

On arrival at the store all consignments are weighed on thoroughly tested scales; weights on railway waybills are not taken as correct.

After weighing, the wool is valued at an average value of all classes contained in the parcel, and if required by the farmer an advance of 60 per cent. of value for all qualities is paid by return of post. The balance will be paid after the wool is classed and sold in various grades.

All wool is classed into the various classes contained, rebaled into neat compact bales, and branded with the departmental brand , which is the only brand in use for farmers' wool by the Department. There are many different classes into which a farmer's wool may be put. The main features considered are:—Length, colour, soundness, condition, freeness from seed and burr, overgrown, charcoal or red soil stained, and the various qualities as in crossbreds or long-wools.

The results for the period of twenty months that the scheme has been in operation have been very satisfactory to growers, and netted them a lump sum of £4,000.

Three hundred and eighty-one bales were sold, the top price realising 21½d. per lb.; and this amount of wool consisted of original parcels ranging from one fleece to twenty-eight bales.

The only preparation of wool necessary is for the farmer to skirt all fleeces lightly by removing stained pieces, rough and bitty edges, folding the fleece over, showing skin side of the wool out, turning neck and breach, and rolling from breach to shoulder, showing the shoulder wool out, thereby exposing the best part of the fleece to view.

This treatment is not absolutely necessary, but it greatly assists the work done by the Department, as that class of work is much easier done when the fleece first comes off the sheep's back than if it were jumbled into a bale or bag and broken up.

Branding.—All bales and bags should be branded with a distinguishing mark, as $\frac{J T}{X}$, and all marks on bales to be on top cap, or on top side flap.

[TO BE CONTINUED.]

THE LANCASHIRE COTTON INDUSTRY.

According to the United States Bureau of Census (U.S.A.), the total area of cotton lands infested by the boll weevil now amounts to 480,940 square miles; yet the present season's crop of cotton in the United States is expected to reach 15,000,000 bales. Middling American cotton—which in 1915 was quoted in the Liverpool market at 5.08d., in 1916 at 8.04d., in 1917 at 19d.—was selling in 1918 at 22.27d. per lb. This, of course, refers to ginned cotton. The present position of the Lancashire cotton trade is that during the first six months of this year there has been more money made than in any similar period in the history of the industry. The majority of firms have made record profits. Mr. F. W. Tattersall, of Manchester, in an analysis of the stocktaking result of sixteen large spinning companies, shows that in share capital there has been a gain of over 45 per cent., whilst on share and loan capital combined there has been a profit of over 33 per cent. per annum, after allowing interest on loans. The share capital of these concerns amounts to £608,552, and loans to £220,820. In the mills there are over 1,500,000 spindles. Most companies have paid either increased dividends or a special bonus to shareholders. Sufficient details are not available for reliable figures to be published relating to the weaving section of the trade, but the past six months has been a very prosperous period, especially for firms who both spin and weave. Owing to the shortage of raw cotton, and the considerable amount of machinery stopped, demand in both yarn and cloth exceeds supply, and there is every probability of big profits being continued, at any rate until the end of the war.

If it were possible to ship over Queensland cotton to England there would be a revival of the times when our cotton sent to Liverpool in 1871 totalled 2,602,100 lb., valued at £79,317. Cotton, then, was universally grown by farmers, particularly in the East and West Moreton district; and at from 3d. to 4d. per lb. for seed cotton, the crop proved to be a very paying one. When, at the close of the Civil War in America, cotton once more was shipped to England, and prices fell to 5d. per lb., the industry in Queensland died out. Under present war conditions farmers have again taken advantage of the facilities afforded by the Department of Agriculture for handling the cotton crop; and for the past three years the quantity delivered at the State Ginnery has annually increased, and the prospects of cotton becoming one of our staple crops are bright. About 40,000 lb. of seed cotton were delivered, ginned, and marketed on farmers' account, during 1918; and the demand for seed for next season's planting has largely increased. As will be seen in our advertising pages, the conditions under which farmers are urged to grow cotton are most favourable, and have enabled growers to realise a good profit on the crop.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, SEPTEMBER, 1918.

The laying on the whole has been fairly good for the month. No rain has fallen, and some hot days have been experienced during the month. Considering the absence of green feed, some of the scores are very creditable. D. Fulton's "A" and "C" birds both broke their respective continuous runs at 70 eggs. Although "B" and "E" have gone broody in this pen, they have put up the highest score for a group, with the fine total of 162 eggs. In the light breeds E. Chester heads the list with 155 eggs. Broodiness is becoming more frequent, and there have been one or more cases in nearly all the heavy pens. Two cases of broodiness have occurred in the light section, viz.:—Mrs. Hunter's "B" bird and Mr. G. Prince's "C" bird. Two deaths occurred during the month, and new birds have been sent. J. Zahl's "F" hen has not yet been replaced. Several birds have been treated for minor ailments. All competing birds will be judged for "trueness to type" during October, and the results published at the end of the month. The following are the individual records:—

Competitors.	Breed.	Sept.	Total.
LIGHT BREEDS.			
*Dixie Egg Plant	White Leghorns ...	142	865
*E. Chester	Do.	155	786
*G. W. Hindes	Do.	137	770
*Geo. Howard	Do.	140	760
*C. Knoblauch	Do.	131	740
*C. P. Buchanan	Do.	129	739
*Geo. Prince	Do.	136	737
*T. Fanning	Do.	126	722
*G. H. Turner	Do.	141	721
*W. Becker	Do.	131	711
*Mrs. L. Henderson	Do.	129	705
*W. Lyell	Do.	135	701
*R. Holmes	Do.	131	698
*Oakland Poultry Farm	Do.	140	681
*L. G. Innes	Do.	134	680
*E. A. Smith	Do.	140	680
*O.K. Yards	Do.	118	664
B. Caswell	Do.	124	653
*Dr. E. C. Jennings	Do.	126	640
*Quinn's Post Poultry Farm	Do.	144	639
*Range Poultry Farm	Do.	120	621
J. J. Davies	Do.	122	620
*Chris. Porter	Do.	120	614
*Thos. Taylor	Do.	114	610
Harold Fraser	Do.	95	601
*Mrs. A. T. Coomber	Do.	122	593

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Sept.	Total.
LIGHT BREEDS— <i>continued.</i>			
O. W. J. Whitman	White Leghorns ...	101	590
*J. Zahl	Do. ...	101	572
*J. M. Manson	Do. ...	129	569
*Homalayan Poultry Farm	Do. ...	134	564
R. T. G. Carey	Do. ...	90	552
Mrs. L. F. Anderson	Do. ...	121	534
*T. B. Hawkins	Do. ...	126	533
S. Wilkinson	Do. ...	101	509
*J. W. Newton	Do. ...	132	508
G. Williams	Do. ...	81	507
*Mrs. R. Hunter	Do. ...	130	507
Mrs. A. G. Kurth	Do. ...	124	504
H. B. Stevens	Do. ...	118	490
Geo. Trapp	Do. ...	110	488
Shaw and Stevenson	Black Leghorns ...	108	485
H. F. Britten	White Leghorns ...	107	475
Progressive Poultry Pens	Do. ...	111	458
B. Chester	Do. ...	102	439
P. O. Oldham	Do. ...	118	434
W. A. Wilson	Do. ...	112	407
A. W. Walker	Do. ...	120	394
HEAVY BREEDS.			
*Nobby Poultry Farm	Black Orpingtons ...	129	797
*A. E. Walters	Do. ...	144	691
*E. F. Dennis	Do. ...	133	683
*E. Morris	Do. ...	132	681
T. Hindley	Do. ...	121	665
*R. Burns	Do. ...	145	636
*D. Fulton	Do. ...	162	636
*Mars Poultry Farm	Do. ...	129	626
*W. Smith	Do. ...	123	620
*J. W. Macrae	Do. ...	120	604
*W. H. Reilly	Chinese Langshans ...	106	597
E. M. Larsen	Black Orpingtons ...	97	579
A. Shanks	Do. ...	137	557
T. W. Lutze	Do. ...	130	494
W. J. Mee	Do. ...	84	480
*F. A. Claussen	Rhode Island Reds ...	107	470
H. Puff	Do. ...	87	395
Jas. Fitzpatrick	Do. ...	103	369
Totals ... ..	...	7,947	39,050

* Indicates that the pen is being single tested.

DETAILS OF SINGLE HEN PENS.

Competitor.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
Dixie Egg Plant	138	137	155	135	147	153	865
E. Chester	132	136	123	152	121	122	786
G. W. Hindes	168	129	124	128	122	109	770
Geo. Howard	119	125	135	126	122	133	760
C. Knoblauch	123	113	138	117	124	125	740

EGG-LAYING COMPETITION—*continued.*DETAILS OF SINGLE HEN PENS—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS— <i>continued.</i>							
C. P. Buchanan	115	119	127	122	133	123	739
Geo. Prince	98	136	126	128	122	127	737
T. Fanning	131	110	132	92	131	126	722
G. H. Turner	73	101	133	134	153	127	721
W. Becker	120	121	100	133	108	129	711
Mrs. L. Henderson	123	106	119	86	134	137	705
W. Lyell	121	126	125	113	106	110	701
R. Holmes	130	127	111	111	101	118	698
Oakland Poultry Farm	101	111	126	129	110	104	681
L. G. Innes	119	137	146	76	79	123	680
E. A. Smith	92	133	118	126	118	93	680
O.K. Poultry Yards	104	121	124	98	121	96	664
Dr. Jennings	94	132	119	101	111	83	640
Quinn's Post Poultry Farm	137	90	102	92	129	89	639
Range Poultry Farm	33	139	85	113	120	131	621
C. Porter	70	108	120	93	101	122	614
Thos. Taylor	72	117	109	93	105	114	610
Mrs. Coomber	86	112	96	103	73	123	593
J. Zahl	124	95	113	106	84	50	572
J. M. Manson	126	116	129	67	57	74	569
Homalayan Poultry Farm	118	101	81	74	111	79	564
T. B. Hawkins	106	85	115	68	86	73	533
J. W. Newton	95	125	48	72	95	73	508
Mrs. R. Hunter	84	117	31	82	93	100	507

HEAVY BREEDS.

Nobby Poultry Farm	150	131	117	112	139	148	797
A. E. Walters	106	141	83	128	142	91	691
E. F. Dennis	141	106	105	64	150	117	683
E. Morris	101	109	135	134	117	85	681
R. Burns	96	108	86	95	133	118	636
D. Fulton	117	107	98	93	65	156	636
Mars Poultry Farm	110	120	99	106	95	96	626
W. Smith	150	118	43	102	93	114	620
J. W. Macrae	64	71	124	98	119	128	604
W. H. Reilly	104	124	107	58	92	112	597
F. A. Claussen	85	84	69	91	94	47	470

DOES POULTRY FARMING PAY?

Mr. I. W. Seymour (a returned soldier) contributes to the "Victorian Poultry Journal" some practical details regarding above. In August, 1917, he purchased 14 birds at a cost of £8 7s. His experience is given as follows:—

On 10th September last we hatched 40 chicks from incubator, and another 40 on 1st October. We had 26 cockerels from this lot; some died, principally owing to want of experience on our part. We have eaten 10 or 12 (saving butcher's meat), and now have 3 fine cockerels eight months old, worth, I am told, £2 2s. each, for sale. We now have the 13 old birds—still laying us a dozen eggs a week—just getting over the moult, and 26 fine pullets, just mostly coming into the "lay," the 10 laying at present returning us 54 eggs for the week ended 12th May, 1918. I

have erected (iron) single-testing sheds for eleven birds, 3 by 6 by 5 ft.; and in them are 11 of the young pullets being tested singly for next year mating knowledge. These sheds cost me, without labour, £10 12s. 6d.

From commencement I have purchased best feed, mostly as laid down by your paper, at full market rates. Cost of feed to date, £9 7s. 6d.; value of eggs laid to date, 223½ dozen at 1s. per dozen, £11 3s. 6d. (I have just sold 9 dozen at 2s. 4d. per dozen wholesale); excess value of eggs over cost of food, £1 16s.; and we are only just now on the threshold of getting any money back. By the end of next week (19th May, 1918) I hope to have 24 pullets laying; and if they do as well as the 10 already laying, you can easily figure out the result. As you know, feed is extortionately dear—wheat, 5s.; maize, 5s. 2d. &c.

The June issue of the "Victorian Poultry Journal" contains some interesting correspondence in connection with the above question. Mr. E. H. Gibbs, of South Camberwell, writes at some length, and from his letter we take the following:—

On 1st May, I had 17 pullets, 6 second-year hens, and 2 roosters, or 25 fowls in all. During May and June very few eggs were gathered, and things began to look gloomy, and I had one of the "cold" turns. Then the mating and breeding season came along, and the temperature went up to fever heat, busied myself buying incubators, brooders, &c., and altogether became thoroughly interested in the work, which culminated in hatching the little balls of fluff which delight the eye, and, perhaps for the first time, awaken the wife's interest in the venture, as she has hitherto been keenly criticising the expenditure. Then on with the anxious time of rearing the young brood; and I might here state that in my opinion the rearing of the chicks is where the utmost care is necessary, for 30 dead in two nights was one of my experiences by being too kind to them, and I ultimately succeeded in rearing about 170 strong chickens, and from them 87 pullets and 4 cockerels, having sold a few and eaten others.

Now for my balance-sheet and comparison of assets for the twelve months:—

BALANCE-SHEET.

<i>Receipts.</i>						£	s.	d.
From sale of eggs	..	..	..	..	..	23	14	6
From settings of eggs	..	..	..	..	..	1	1	9
From sale of chickens	..	..	..	..	..	0	9	0
From young cockerels	..	..	..	..	..	2	7	9
To debit	..	..	..	..	..	2	15	10
						£30	8	10

Expenditure.

Feed, kerosene, &c.	..	..	..	..	..	28	5	10
5 per cent. interest on capital of £43	..	..	..	..	..	2	3	0
						£30	8	10

COMPARISON OF ASSETS.

1st May, 1917.						£	s.	d.
17 Pullets, at 5s.	..	..	..	..	..	4	5	0
2 Roosters, at 5s.	..	..	..	..	..	0	10	0
6 Second-year hens, at 3s.	..	..	..	..	..	0	18	0
To Cr. balance	..	..	..	..	..	23	10	0
						£29	3	0

30th April, 1918.						£	s.	d.
87 Pullets, at 5s. each	..	..	..	..	..	21	15	0
20 Breeding hens, at 5s. each	..	..	..	..	..	5	0	0
6 Hens, at 3s. each	..	..	..	..	..	0	18	0
2 Roosters, at 5s. each	..	..	..	..	..	0	10	0
4 Cockerels, at 5s. each	..	..	..	..	..	1	0	0
						£29	3	0

or a credit balance on the whole of £20 14s. 2d. for the twelve months. I have assessed the value of the pullets at 5s. each, but they are worth much more.

The Horse.

OUR HORSE-BREEDING INDUSTRY.

Under this heading, with the sub-heading "Haphazard Methods," a contributor to the "Australian Farmer," Melbourne, 15th August, writes:—

Reports of the doings of Australian horses in Egypt and in France leave no doubt as to their superiority so far as toughness is concerned. The sizzling heat of Egypt and the freezing winters of France seem to be alike tolerable to them. American and Continental horses are easily outclassed by the Australian-breds. Official reports are laden with enthusiastic praise of the wonderful endurance of the mounts of our Light Horse Regiments in across-desert stunts.

Taken straight off fresh water on to the brackish—almost salt—desert well water, 900 horses carried our boys on a long journey over sand dunes for many days. Saddles were rarely removed; drinking-places were precariously distant from one another. For several days at a time the poor game brutes were without water; but these hardy Australian equines did not fail. They went and returned, the only casualties being one horse lame, and two developed colic.

The Arabian horse is outclassed in his own country by the military horses of Australia. There is ample evidence of the fact in the reports of trustworthy officers. It even has been asserted that the camel cannot "get away with" the Australian horse in desert travelling.

From France come glowing reports of the endurance of our horses—horses that have survived all manner of hardships in more than three years' transport work. They have survived—or, rather, 60 per cent. of them have worked incessantly throughout nerve-racking, muscle-straining service close to the firing line. It was not fair average toil, for the wheels often sunk until the wagon floors scraped the slushy surface. Horses which came from other sources to fill the occasional gaps in the Australian teams proved but poor substitutes.

From the veterinary hospitals we learn of the wonderful response to veterinary treatment made by wounded Australian horses.

In Egypt there seems to be no limit to their toughness. One official report concludes:—"If a reasonable quantity of water is kept up to these horses, they will go on practically indefinitely."

The popularity of our horses at the Front is undeniably great. A returned officer tells that the first question English "heads" ask, when applying at the depôts for equine reinforcements, is: "Have you any Australian horses?"

Little wonder that our khaki-clad boys abroad display so much affection for their four-footed comrades. Australia is the finest horse-breeding country in the world. Its indigenous grasses are not only extremely nourishing, but they retain high feeding value for months after they have become browned and shrivelled for lack of moisture. The climate is so genial in this land of sunshine as to make the winter stabling of stock unnecessary; but what contributes more than anything else to the creation of toughness in the Australian horses is, perhaps, the severe droughts that come so irregularly, yet so surely.

In the drought-stricken parts beyond the track of the plough, hundreds of horses perish from hunger and thirst. Ere rain comes, the survivors are merely moving shapes of bone and hide. Their toughness is amazing, for they seem to be able to retain a grip on life when there is apparently nothing edible and no moisture to sustain them.

When the rain comes, the rested and sweetened earth quickly gives forth abundant succour to its dumb dependents. The long-starved horses exhibit their powers of recuperation by making marvellously rapid return to robust condition. The climatic eccentricities of Australia have been an appreciable factor in creating the now-established toughness of our horse stock, since for generations succeeding droughts have left only the strongest equine individuals to sustain our horse-breeding industry. Nevertheless, we must remember that the horses shipped overseas from the Commonwealth represented the cream of our utility studs. The military buyers combed every State and searched every hole and pocket to get horses good enough for shipment.

LACK OF METHOD.

Our breeders, as a whole, must not plume themselves because Australian horses have gained such favourable notice at the Front. Rather, they should look at the thousands of horses that the military buyers declined to take. Soon they would realise that there is something wrong with our horse-breeding industry, something wrong with our methods of production—a fact which ought to arouse in our horse-

breeders early recognition of the haphazard means by which the industry they represent is kept in existence.

The sheep man carefully culls his studs and flocks, and is ever alert to employ the best stock procurable to improve his products. He will not put a price on his best ewes.

In ridiculous contrast is the attitude of the average breeder of utility horses, who will sell anything. When he discovers that a mare is an indifferent worker, he finds a way out of a difficulty as to what he shall do with her by "sending her to the horse." On the other hand, when asked why he does not breed from an extra good mare, the usual reply is: "Oh, I can't do without her."

Often it may be noticed that the small breeder sends to the stud only mares that he can easily do without.

It must be admitted that the oft-recurring depression of market values has been responsible for the evident indifference with which the landholder views his little horse-breeding side-show. During the past fifteen or sixteen years, military requirements have made our horse export trade an important one. At varying periods big orders have come for war horses. The rush with which big shipments were collected for this purpose enabled owners to get rid of a big percentage of undesirable horses as well as their best sorts.

SACRIFICING MARES.

One of the most regrettable influences towards the deterioration of our horse stock has been the indiscriminate sale of good mares for shipment overseas. During the Boer War thousands of mares were sent away. For the Boxer War, in China, the German Government purchased, at a high price, hundreds of very fine horses, which included a big percentage of the best mares in Australia. When Japan was at war with Russia, representatives of the Mikado bought thousands of serviceable horses. With them went at least hundreds of mares of superb conformation.

Amongst the hundred and thirty-odd thousand horses shipped since the present war began were many high-class mares, although it is comforting to know that the Defence Department issued an instruction that kept the exportation of females down to a reasonably small percentage.

It would be a low estimate to conclude that within the past twenty years Australia has lost 50 per cent. of her best mares to oversea bidding. The Indian trade, since its inception forty-six years ago, has taken, perhaps, mares to the proportion of one-third of each shipment. Horses exported to the order of the Indian Government in time of peace are only of the highest military classes, so that the loss in mares in this direction alone has been so great that several of the shippers themselves have recently advocated schemes for the prohibition of the exportation of good mares.

THE GOVERNMENT MUST MOVE.

Not only is legislation urgently needed to prohibit the exportation of choice mares and to prevent the use of mongrel and unsound stallions, it is imperative that the Federal Government should move practically in the direction of guiding and assisting those engaged in the horse-breeding industry in every way possible.

We do not suggest that the Government should enter into competition with private enterprise, but that experimental breeding farms should be established, to discover to breeders the best methods of production, and to create for those needing instruction examples of the most marketable types.

The only recognition made of the recommendations which resulted from the important horse-breeding conference held in Melbourne a couple of years ago was the formation of a remount stud at Maribyrnong last year. Certainly this is a step in the right direction, because operations are being conducted by men experienced in the horse-breeding business. Something like 100 high-class mares, selected from the thousands purchased for the war at an average of £20 1s. 7d. per head, have been mated with high-class thoroughbred stallions for the production of military horses. The stallions now at Maribyrnong are:—Three Star (a good performer under heavy weights), Jolly Maltster (a proved sire of good stock), Piastre (winner of the Melbourne Cup, V.R.C. Champion Stakes, and other weight-for-age events), and Malt Flag (a half-brother to Red Signal, and himself a good performer and tried stock-getter). Piastre is one of Australia's greatest stayers. Three Star and Malt Flag—respective winners of the big prizes for best remount sires at the Sydney Royal Show of 1917 and 1918—were presented to the Defence Department.

The mares so advantageously collected by the Remount Department for the formation of the stud at Maribyrnong have exacted the admiration of front-rank breeders and men engaged in the Indian trade. They are identical with the class being ear-marked in France by the Imperial Remount Department to mate with blood horses in England, after the war, to produce hunter-type cavalry horses.

Piastre, Three Star, and Jolly Maltster, together with half a dozen mares and a team of cavalry horses, were taken over to the last Sydney Show as a non-competitive exhibit, which aroused the enthusiastic approval of the Press and of the many

horse-breeders and others on the other side of the Murray. This one Government stud is but a small start of a necessarily larger scheme, which should embrace the raising of high-class stallions which could be made available to breeders at a low service fee.

THE REPATRIATION SCHEME.

The repatriation scheme, which is to provide for the placing of thousands of returned soldiers on the land, reminds us that fresh influence will be brought to bear upon the future of our horse-breeding industry. These soldier settlers may be depended upon to swell the ranks of small horse-breeders. Their numbers will make their combined operations in this direction an important factor in raising or lowering the standard of our equine stock.

The Remount Department, now well experienced in the buying and distributing of horseflesh, is fully equipped with the machinery to guide the soldier settlers in the matter of laying a good foundation for their horse-breeding operations.

So far, we understand, the Repatriation Department has not enlisted the services of the Remount Department in procuring horses for the returned boys; nor has it given any apparent consideration to the horse-breeding possibilities of the scheme.

Only mares, and mares calculated to produce first-class stock, should be issued to the soldier settlers. The establishment of the Remount Stud, which embraces four valuable stallions, suggests great possibilities in the direction of supplying to the returned soldiers mares that have been mated with one or other of these stallions.

The horse-breeder of the future will be the small farmer. The big horse-breeding stations practically have faded away before the march of closer settlement. Thousands of small holdings have succeeded them; and thousands of small farmers are doing the horse-breeding. This multiplication of controlling influences means an immense increase in the varieties of type. It means a deplorable lack of uniformity; and it also means that our horses will rapidly deteriorate if something is not done at once to put our horse-breeders on the right track.

The farmers of the Wangaratta district have decided, through the local organisation, to invite kindred bodies to combine with them to urge the Government to do something for the horse-breeding industry.

THE COMING DEMAND FOR HORSES.

From the same source we take the following article by B. Folliot Sandford:—

The effects of the present war are, of course, felt directly or indirectly by all members of the community and in all branches of industry. In commercial circles the prices of commodities have been so largely increased that the cost of living has become a very serious problem indeed. The enhanced price is not as yet observable in the case of horses—heavy or light—which are now obtainable at lower figures probably than have hitherto existed in this country. There would appear to be no dearth of supply for present purposes, but the quality of animal available is certainly inferior to those with which our saler yards are usually stocked in normal times.

There are, doubtless, other factors besides the war operating upon the prices of horse stock, but it is certain that when the times of peace return the public will have to pay—and pay well—for all classes of horses. During the currency of the war the best horses available the world over have been sought out for army use; during the first nine months no fewer than 60,000 horses were sent from Australia alone, and there has been a steady drain upon our reserves ever since. Very few, if any, will return into civil use, because those which survive the dangers and terrors of the battlefield will—at least as regards most of those sent from this Commonwealth—be absolutely debarré by the rigid laws of quarantine. They must be viewed, therefore, as non-existent, and consequently, with the return to peace conditions, our horse stock must of necessity fall far behind requirements.

Owners of mares will find it to their great advantage to prepare for the approaching demand by raising foals freely; but in doing so it is imperative that the question of quality must be studied. It is well to remember in this connection that the opinion accepted as that of the general public upon any subject is that formed by, and based upon, the utterances of certain persons whom the majority of the public itself, consciously or unconsciously, has invested with perfect knowledge of that particular subject. The natural result of this act of faith or folly is that upon most subjects, at one time or another, the public is carried away *volens volens*, and little by little an erroneous standard is established, to which the public—as a whole or in the main—not only consents, but blindly accords its hearty support.

This has for long been adversely affecting the quality of our Australian horses; and horse-breeders would act wisely by seeking advice of undoubted value upon the highly important subject of the selection of sires, because, since horse-breeding on sound lines has of late been to a great extent departed from, a very nondescript class of stallion will be rushed into service when better prices prevail.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FROM 31ST AUGUST TO 30TH SEPTEMBER, 1918.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Auntie's Lass ...	Ayrshire ...	1 Aug., 1918	237	4.2	58.26	
Gay Lassie ...	" ...	29 Aug. "	998	4.0	44.60	
Iron Pica ...	Jersey ...	1 Sept. "	761	5.0	42.95	
Netherhall Q. Kate	Ayrshire ...	29 Aug. "	771	4.2	36.27	
Miss Betty ...	Jersey ...	9 June "	387	7.2	30.96	
Netherton Belle ...	Ayrshire ...	30 Aug. "	661	3.8	27.99	
Yarraview Ida's Hope	Guernsey ...	5 May "	455	5.2	26.81	
La Hurlette Hope	Jersey ...	10 July "	355	6.2	24.20	
Violet's Peer's Girl	" ...	31 Aug. "	481	4.4	23.75	
Burlesque ...	" ...	25 Aug. "	533	3.8	22.56	
Skylark ...	Ayrshire ...	23 July "	561	3.6	22.44	
Rosine ...	" ...	26 Aug. "	622	3.2	21.94	
Lady Milba ...	Holstein ...	31 Mar. "	618	3.2	21.80	
Sweet Meadows ...	Jersey ...	1 Sept. "	503	3.6	20.12	
Miss Security ...	Ayrshire ...	19 July "	500	3.6	20.0	

CALCULATING BUTTER FAT AND "OVER-RUN."

It is estimated that 100 lb. of fat in cream is equivalent to 103 lb. fat in milk. This is accounted for because the loss of fat in the skim milk falls upon the suppliers instead of the factory, and other minor losses in manufacture are avoided. In a general way it may be said that the over-run in milk, when samples are taken with great care and all the apparatus is correctly graduated, will average about 16.23 per cent.—that is, the pound of butter made will be one-sixth more than the pound of fat in the milk. With cream testing from 25 to 35 per cent. fat, the over-run will average not far from 20 per cent. That is to say, 100 lb. of fat in cream is expected to make not less than 120 lb. of butter. Stated in another way, the fat in cream will produce on the average about 3 per cent. more butter than the fat in milk. Hence, to adjust the returns in a factory where there are both milk and cream suppliers, it is suggested that the fat in the cream be reduced to its equivalent in milk by adding 3 per cent. to it. Thus, if Supplier A furnished 1,000 lb. of 4 per cent. milk, and Supplier B 100 lb. of 25 per cent. cream, the former should be credited with 40 lb. of fat, and the latter with 25 lb. plus 3 per cent., which would be 25.75 lb., and the total fat upon which to base the return would be 65.75 lb. It costs somewhat more to make butter from milk than from cream, for there is the expense of running the milk through the separator and the cost of the extra vats and pumps for storing and handling the milk and the skim milk. This extra expense would vary with the amount of milk. It would be scarcely appreciable as between 10,000 lb. and 11,000 lb.; but the extra expense might amount to about 2s. for milk; enough to make 100 lb. of butter.—“Australian Farmer.”

The Orchard.

SAFETY ATTACHMENT FOR A FRUITGROWERS' LADDER.

Many of our best citrus and other orchards are situated in hilly country, and where trees are planted on hillsides the gathering of the fruit requires that the ladder shall be firmly planted. Ordinarily a block of timber is placed in position at the foot of the ladder on the lower slope. This has occupied the attention of Mr. L. Stemp, a well-known fruitgrower at Palmwoods (N.C. Line); and he has devised a simple means of adapting an attachment to a ladder, by which, on reasonably sloping ground, the latter stands as it would on level ground, thus obviating all danger of a capsize down hill. The accompanying sketch gives a clear idea

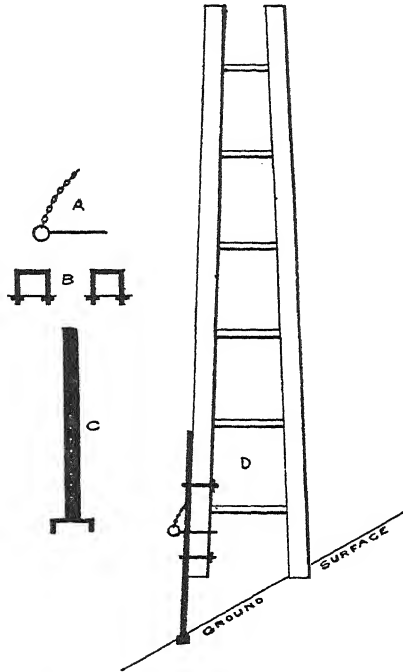


PLATE 29.

of the attachment in operation. Mr. Stemp has patented his invention, which, like many more important inventions, will doubtless come into general use. He names it "The Fruitgrowers' Ladder Attachment for Safety on Hillsides."

The whole attachment only adds $3\frac{1}{2}$ lb. to the weight of the ladder, and may be adjusted to any variable surface, as shown in the sketch, or it may be either removed, if not needed, or slid up. The bar has 5 holes, 2 inches apart. On the ladder foot there are 2 holes, 3 inches apart, 5 and 8 inches respectively from the bottom, to receive the pin.

Horticulture.

THE ROSE.

The great secret in successful horticulture is a perfect knowledge of the seasons, so as to adapt each variety of cultivated flowers to the needful temperature and rainfall. For roses to give complete satisfaction, they must be allowed ample room for the roots to spread and feed, with plenty of light and air to ripen the wood. Hence, seasonable planting, seasonable pruning, and seasonable working are the elements of success.

The proper season for planting roses is from March to August, and the main pruning should be done in June or July. The cuttings may be planted in beds for future setting out. The freest flowering roses are the Tea, Noisettes, Bourbons, and some of the hybrid Chinas and perpetuals. Some of the Teas and Noisettes will bear pruning whenever they are at rest and out of bloom, and this process will hasten their blooming again. Hybrid perpetuals must only be pruned during the main pruning season.

The best soil for roses is a deep, rich, strong loam free from stagnant moisture. Some like a sweet clay subsoil. Sandy, gravelly soils are not suitable. But, if such are the only soils available, they must be improved by a dressing of strong loam in conjunction with cowdung or nightsoil. The latter, if properly prepared, and not too fresh, is really the very best manure for roses in all soils except those which are naturally rich. If artificial manures are used, the trees will be much benefited by a manurial dressing once in three weeks of 1 lb. of nitrate of soda to from 50 to 75 gallons of water. After application, moisten the soil slightly. Old stocks require more dilution—say, 100 gallons of water to 1 lb. of nitrate. The soil may be soaked with this. Heavy soils are improved by adding burnt earth or gritty refuse with stable manure and leaf mould or cocoanut fibre refuse. Damp soils must necessarily be drained. Roses require a constant annual supply of manure, with liberal supplies of water, during the growing season, and especially must they be kept clear of aphides and other insect pests. This may be done by dusting them with tobacco dust when the branches and leaves are moist with dew and washing it off with a syringe next day, or spraying them with tobacco water or kerosene emulsion. A very effective spray pump is the Cyclone, which may be obtained from most seedsmen. It possesses the advantages of lightness, cleanliness, and effectiveness, and is especially adapted for ladies' use in the bush or hot house, or for garden spraying, being easily worked. It delivers a fine spray, which may be rendered heavier by working the plunger quickly. Used with a spraying fluid of extract of tobacco, whale-oil soap, or kerosene emulsion, it is effective in searching out green fly or mildew on delicate flowers and roses. For orchids and ferns the spray should consist of ammonia sulphate. It is also very handy for spraying the walls and roofs of poultry-houses.

Some growers prefer to grow roses on their own roots; others, on briar stocks. When growing on their own roots, should the tops die down from any cause, the roots will throw up fresh shoots true to their kind; whereas, if the grafted rose dies back, nothing will come in its place but the original briar. When dwarf beds of roses are required, a good plan is to peg down, to within about 6 in. from the ground, the strong one-year-old shoots from the root. In due time blooming shoots break out from nearly every eye, and masses of flowers are secured; while strong, young shoots are sent up from the centre, the plant being on its own roots. Before the winter, the old shoots which have then flowered and exhausted themselves may be cut away, and three or four more of the strongest and best-ripened young shoots are reserved for pegging down in the following season, say, in July or August. In the meantime, after the pruning has been effected, plenty of good manure should have been dug in around the roots. Thus treated, the plants never fail to produce plenty of strong wood for pegging down each season. To make kerosene emulsion, use 8 oz. of ordinary soap cut up and dissolved in 2 gallons of boiling water. When dissolved, add cold water to 4 gallons and 2 gallons of kerosene, well stirred during use. The emulsion must be warm when used. Tobacco spray is made with two fluid ounces of black leaf tobacco to one gallon of water.

Viticulture.

PRACTICAL HINTS ON ESTABLISHING A VINEYARD.—No. 7.

By P. MAHONEY.

IMPLEMENTS AND METHODS BEST ADAPTED TO CULTIVATION.

One of the most important factors in caring for a vineyard and bringing it into bearing early is cultivation. To conserve all the moisture possible for the plants' requirement, and to tide them over dry spells without any loss of growth or fruit, depends upon the cultivation, which cannot be too widely advocated, for it also has many other advantages, such as keeping down weeds and grass, which are moisture robbers, and also by disturbing the soil, thus affording the light and air more scope for action upon it, which action sweetens the soil and makes available plant food which otherwise would never be fit for assimilation by the plants.

Enormous quantities of moisture can be lost through leaving the cultivating until after the surface soil has become crusted and hard. When these conditions prevail, the moisture is drying out rapidly. If the ground has a tendency to set hard and become crusty before it is in a fit condition to be cultivated (as some soils will), that difficulty can be overcome by harrowing the land with a light harrow when it will just carry the horse without bogging; and such treatment will prevent the surface of the soil from caking, and results in a fine and thorough cultivation later, otherwise the soil will be in a cloddy condition after cultivation, thus affording greater scope for evaporation of moisture.

It is very important that the cultivation of the vineyard should continue until the vine has ceased growing. It is bad policy to discontinue cultivating after harvesting the fruit, for it is just as important for the plant to be supplied with abundance of moisture after harvest as before, to enable it to furnish buds with plenty of matured buds for the following crop. The plant needs to be supplied with plenty of moisture right up to the time when it becomes dormant. If this treatment of the vine is neglected after it has produced a crop or crops, its constitution is weakened, and consequently it becomes less productive every year (for, like human beings, it needs nourishment just as do the former as much after a heavy day's work as before it to store up energy for the following day's task). Good treatment to the vine after harvest plays just as an important part as manuring does.

To afford a thorough cultivation to a vineyard, a two-horse implement is essential, so as to admit of close working without damaging the vine, for with a one-horse implement it takes three times as long and greater risks are run, as it is difficult to cultivate close to the vine, and the work is not as thorough, as some ground is likely to be missed. A two-horse Planet Junior cultivator is generally the favoured implement, for it does good work at a minimum of cost. With this implement the ground under the vine can be disturbed right up to the butt of the vine without doing any damage to the vine or foliage, thus saving a lot of labour in weeding, &c., under the trellis. I find the small duck feet tines do the best work, for they leave the soil in a fine mulch, and they are more likely to destroy weeds, &c., than the other tines. A general weeding of the vineyard can be done by fixing the weed-cutting tines on to the cultivator and running them just deep enough to sever the weeds and undesirables below their crowns. This being done on a hot day has a beneficial effect in cleaning the vineyard.

The disc cultivator is a very useful implement when the vineyard is dirty and hard to keep clean, for it is an ideal implement for chopping up weeds, &c. It is more effective than the tine cultivator. But it has a few disadvantages, for it is of a heavy draught, and needs two strong horses to pull it when set to do good work. It also has a tendency to pack the subsoil tight through the discs, continually pressing the soil down. But it is a very useful implement in breaking up cloddy ground and where the soil is of a heavy nature. Both disc and tine cultivator can be made good use of in a vineyard.

[CONCLUDED.]

Botany.

BOTANICAL COLLECTION IN PAPUA.

The Government Botanist (Mr. C. T. White) has recently returned from a five-weeks' stay in Papua, which he visited as the guest of the Lieutenant-Governor—His Excellency Judge Murray—for the purpose of studying and collecting specimens of the vegetation, of which comparatively little is known. The shortness of the stay did not allow of a very detailed examination being made nor a number of places being visited.

The vegetation about Port Moresby (Mr. White says) reminds one of poor forest country in North Queensland, consisting for the most part of grass-covered hills with scattered white-barked Eucalypts of stunted growth dotted about. Other very common trees on the hills are *Alstonia scholaris* (Milky Pine) and *Albizia procera*. The Nut Fern (*Cycas*) is also very common. In the gullies and round the sea-beach are found patches of thin scrub supporting a more varied flora. Every here and there bright masses of scarlet can be seen—the flowers of *Bombax Malabaricum* (the Silk Cotton Tree)—a large tree ranging through North Australia, New Guinea, and Tropical Asia. Round about the rocky sea-coast near the town a species of *Cochlospermum* (a small tree) is also very noticeable on account of its abundance of large, bright, yellow flowers.

After a few days' stay in Port Moresby, Mr. White left—in company with the Papuan Government Geologist (Mr. E. R. Stanley, B.Sc., F.G.S.) and fifteen carriers—for the Sogeri Plateau and Javararie, via Sapphire Creek and Hombrom Bluff. On the Astrolabe Range (about 2,000 ft.)—Hombrom Bluff, Mt. Warirata, &c.—vegetation for the most part is of an open character, the principal forest trees being *Eucalyptus* spp. *Casuarina nodiflora* (a species of Shea-oak not found in Australia), *Banksia dentata* (a Honeysuckle), *McLalencu* sp. (Tea-tree), *Diplanthera tetraphylla* and *Timonius Rumphii*.

On the Sogeri Plateau itself the vegetation is very rich and tropical, being mostly evergreen jungle, reminding one very much of the "scrubs" of North Queensland, but perhaps of a more tropical nature.

Sogeri Plateau is a great centre of rubber cultivation, and several large and successful plantations have been established.

Further on, Javararie—nearly 50 miles by road from Port Moresby—is one of the oldest rubber plantations, and produces some of the finest rubber in the Territory; but the lack of decent road communication with the sea-port militates greatly against its financial success. Botanically, round Javararie the country is particularly rich and tropical in character, and a large number of plants was here gathered.

A few days after returning to Port Moresby, Mr. White left for Yule Island and the Mafulu district, again having the advantage of the company of Mr. Stanley. At Yule Island twenty-five native carriers were obtained for carrying the camping outfit, collecting gear, specimens, &c. The journey was made over to the mainland and up the Ethel River as far as Bioto by native canoes, a most comfortable method of travelling in favourable weather.

Time did not permit of much collecting along the banks of the Ethel River, though the mangrove swamps, Nipa palms, and rich tropical vegetation fringing the banks of the river and of Bioto Creek promised a rich field for the botanist.

On reaching Bioto, the canoes were drawn up on the bank and the five days' march to the mountains commenced, the following places being stopped at *en route*:—Kubunah, Fofofoto, Dilava, Deva Deva, Mafulu, and Bella Vista.

An excellent well-graded road has been surveyed and made under the direction of the Mission Fathers from Bioto as far inland as Ononge, which makes travelling in this country comparatively easy; and travellers in the Mekeo, Dilava, and Mafulu districts—the sphere of influence of the Roman Catholic Missions—are indebted to the missionaries for the facilities with which travelling can be accomplished in these parts of Papua.

The vegetation in the mountain country is extremely rich and varied—ferns, lycopods, orchids, begonias, palms, bamboos, and other tropical forms predominating.

In the Mafulu country, as in other mountain parts of Papua, the most appreciated article of trade with the natives is salt, with which carriers can be paid and provisions bought. Unlike the coastal people, the mountain folk do not press for tobacco in payment of services rendered, but always for salt, matches, beads, &c., tobacco of good quality being largely grown in all the mountain villages.

Mr. White has not, of course, had time as yet to go critically through his collections, but expresses himself as well pleased with the results, considering that, besides a number of species new to science, he has collected a number of Australian and other plants as yet unrecorded for New Guinea.

Entomology.

THE SUGAR INDUSTRY.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Entomologist to the Bureau, Dr. J. F. Illingworth:—

With reference to the editorial "Dealing with the Cane Grub" in the August "Sugar Journal," we certainly do appreciate suggestions from men of experience. Indeed, the success of our problem rests largely with the growers themselves. Experimentation, with us, is necessarily limited to the restricted area about Gordonvale; and it is only by free discussion and suggestions that we can hope for early conclusions. The problem is a tremendous one; and a man, single-handed, might spend many years upon it.

Through the splendid co-operation of a few growers we are beginning to see daylight, along the lines of cultivation and the supplying of humus, as indicated in our recent reports. Our experiments with poisons, which are numerous, are not yet concluded. I may state, however, that I am seeking a more satisfactory method of applying the poison than that outlined in Bulletin No. 4 of this station. I cannot advise the open furrow alongside the stools, because of the tendency to dry them out too much.

D1135 VS. GORU.

In a former report I called attention to the rooting systems of these two canes. I have been following the matter up, and have found every evidence of the superiority in the ratooning qualities of D1135. It is a cane that comes away with abundant shoots, and hence requires vigorous ratooning. It is well to slice right into the stool on each side, so that too many stalks will not develop and result in a grassy crop.

Mr. C. V. Hives, who is a man of recognised experience and ability, has called my attention to an interesting experiment which he has had with the two above varieties. He planted four rows of Goru down through the centre of a field of D1135. The first ratoons on this block were out last June; and after ratooning the second time he found that practically all the Goru died out entirely, while the D1135 is doing very well. Undoubtedly, this result is due to the character of the roots of the two canes.

In ratooning during dry weather Goru often succumbs, while under moist conditions it usually does well. I believe that this is due to the fact that the main roots, which are lateral, are broken off in ploughing and the stool dries out too much. This supposition is borne out by the fact that Goru which was not ploughed, on the same farm, is growing well.

Again, referring to the ratooning qualities of D1135, Mr. P. Wienert showed me one of his fields at Fishery Creek, which was planted with Badila in 1916; he supplied the misses, which were abundant, with D1135. At the time of my recent visit, practically all of the Badila had been killed out by the borer beetle, and the shoots of D1135 were very conspicuous because of their great vigour—none of them had suffered in the least from the pest.

PARASITES OF THE BORER BEETLE.

The tachinid parasites (*Ceromasia sphenophori*), referred to in my recent reports, have emerged splendidly in our cage at Gordonvale, where they have had our close attention; but those placed at Babinda and Moolaba have not fared so well; for on two occasions we found that ants (*Pheidole negecephala*) had got into the boxes of cane and were making their nests in the channels of the borers. We have no way of knowing, in these cases, whether the flies have escaped safely or not, and must wait for some months to see if they become established in those districts.

We feel rather confident of the result in our own district, because the flies were liberated from day to day, after they had mated in the large cage; and we sometimes saw them flying about in the borer-infested cane, which is alongside. They will have a good chance in this field, for it is not to be cut until the end of the season, and there is plenty of other cane near by.

BORER BEETLES, RATS, AND OWLS.

Let me call attention to the close relation existing between borer beetles and cane rats; and, further on, the value of barn owls in destroying these rodents.

It is a recognised fact that the borer beetles work along the lines of least resistance in depositing their eggs. If they find a split or hole in the rind of the cane they take advantage of it, for they are able to deposit their eggs more abundantly. The stalks chewed by rats are ideal locations for finding the young grubs of the borer, and for this reason let me urge that they should be discarded when cutting cane plants.

Let us recognise then that the destruction of the cane rat is an important step in the control of the borer beetle, where soft varieties are grown; and, again, that rats are more abundant in badly cultivated fields, especially those with weedy headlands. I think this may be accounted for by the fact that owls are unable to catch the rodents thus protected. When the headlands are clean the birds are able to discover their prey as the rats cross from one field to another.

My experience with the American Barn Owl (*Strix practicola*) will be of interest to those suffering from a pest of rats.

A pair of these birds had been nesting for some time on the top of a large, unused chimney of a school building. Upon examination I found that the chimney was almost filled with the cast-up pellets of the birds. Every bird student knows how the owl regurgitates the bones, hair, and so forth in a little pellet shortly after each meal. After raking these out of the chimney, they almost filled a two-bushel bag; and each one represented a rodent—identified by the skull, which was entire. I took the exhibit to a farmers' club, where it stirred up great enthusiasm for the protection of the owls.

I was pleased to learn from the literature here that Australia has four species of barn owls, and that one (*Strix delicatula*) was said to be common in North Queensland. Investigating the matter in the vicinity of the laboratory at night, I soon discovered a pair with several full-grown young. These birds have a call which is not unlike that of our American species. I can best imitate it by forcibly exhaling the breath between the tongue and teeth—a sort of rasping sound. They are very friendly, and come around the buildings at night, even perching on the water tank at the house when I gave their call.

This immediate region does not suffer from cane rats, and I do not doubt that these birds are doing their part to hold them in check.

MOTH PESTS.

Both the Army Worm (*Cirphis unipuncta*) and the Noctuid Moth Borer (*Phragmatiphila truncata*) are rather troublesome this season in places along the Mulgrave River. Fortunately, both species are attacked freely by parasites which keep them from becoming serious pests.

Every grower is familiar with the work of the army worm on young cane plants, the leaves being chipped out at the edges, and the caterpillar is usually to be found during the day hiding between the top leaves. The work of the noctuid moth borer, though less familiar, is easily recognised on young canes, for the central leaves are usually killed entirely, all the feeding being done inside the shoot. On old cane the caterpillars work behind the upper leaf-sheaths, boring into the stalks here and there; but their work may be easily recognised by the abundant frass that they throw out.

The caterpillars do not remain long inside the stalk, for a single individual may make a number of tunnels—evidently only going into them to feed and to hide during the day. The principal damage to mature cane is that they cause it to shoot freely at the eyes, due to the injury of the terminal bud.

I would suggest, as a possible control measure, the application of a green crop of beans or peas before planting cane again. This, however, would be of little avail if there were other infested fields of cane near by.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Field Assistant to the Bureau, Mr. J. C. Murray:—

During the month of August the districts of Nambour, Maryborough, Pialba, Childers, and Bundaberg have been visited, and as many farmers as possible called upon.

I find that in Nambour crushing has been proceeding since the 31st July. Prospects generally are fair, though the farmers seem to have suffered rather severely from the frost, although not so badly as at Bundaberg.

The principal varieties growing are D1135, N.G. 16, and H.Q. 285. Some farmers have small quantities of Purple Innis and Malagache, though the D1135 seems easily the best cane for this district. It has, however, a tendency to become thin and weak looking after the second ratoon crop.

Most of the land here has an acid reaction, as very little liming or green manuring has been done. Advice as to the best methods of getting results was eagerly sought after by the farmers, for, taking many things into consideration, they have had rather an uphill fight around Nambour.

The soil is rather hard to define. In some places it might be termed alluvial with a fair quantity of gravel, but a great deal of it is a heavy dark soil fairly rich in humus. The low-lying portions are not well drained.

No labour troubles have been experienced, most of the work being done by co-operation.

Cane farming around Maryborough appears to be declining. A good deal of 1900 Seedling is grown as well as D1135. Some of the farmers have a small quantity of Rappoe. The frost was fairly severe here; most of the cane is touched, though not severely, the tops only being damaged. Most of the farmers have a fair quantity of standover cane, principally D1135 for the Island. Plantation conditions are good. Soil conditions in Maryborough are very much the same as Nambour. Acidity in the soil is very pronounced. Conditions of labour are good as regards cane cutting.

Very few farmers volunteer ratoons, most of them burning the trash as the cane stands. The cane is peculiarly free from disease in this district.

At Pialba things are, from a farmer's point of view, discouraging. No frost has been experienced, but good results are not being obtained by the farmers. I consider this is due to lack of cultivation and neglecting to green manure and lime. Varieties of cane here are D1135, Black Java, 1900 Seedling. The same can be said here as regards acidity as of the other districts. The soil consists of a sandy loam with gravel and a heavy dark soil with a clayey subsoil. Some farmers are growing the Clark's Seedling, but of all the varieties the D1135 seems to do best. There are no local sources of lime around Pialba, most of the farmers dealing with the Degilbo Liming Company.

The Childers district, excepting that it is dry, looks very prosperous. The cane is untouched by the frost, and some of the 1900 Seedling is a picture. Nevertheless the land is becoming sour, and unless the farmers look to it they will very soon be getting poor crops.

There is a great deal of standover cane around Childers, due to the mills being idle during part of 1916. The soil here is a red volcanic, stony in places, and invariably, where cane is growing, has an acid reaction. The 1900 Seedling does better here than any other variety, although some of the Badila looks well. Clark's Seedling and D1135 show medium results. Rain is badly wanted in all the districts, and the cane planted in March will not make much of a showing, owing to the long spell of dry weather, unless rain falls soon.

Artificial drainage is hardly necessary around Childers, as most of the farms are on high land. Successful irrigation should be possible here.

Some trouble is being caused by the grubs, but if the land is kept clean and well cultivated the pest can be largely kept down.

Bundaberg is badly frosted, especially around Kalkie, Burnett Heads; Qunaba and Barolin have not suffered so severely as other places. Some growers have been using Mauritius Bean and cowpeas as a green manure, and the results are justifying the work done.

Badila and 1900 Seedling are making an excellent showing.

Animal Pathology.

IMPETIGO OF THE PIG.

By LIONEL B. BULL, B.V.Sc., South Australian Government Laboratory of Pathology and Bacteriology.

During the past two years a disease in young pigs has come under the notice of the staff of the Stock Department. Although the disease does not appear to have become very widespread there is some evidence to show that it is becoming more common. The disease appears to be more or less new to this State. It is characteristically a skin disease. It is found only in young animals, and usually appears at the age of two or three weeks, and rarely as late as ten weeks. It runs a more or less chronic course, but the mortality is usually very high, all the affected animals dying in most cases. Death occurs from one to three weeks after the first appearance of skin lesions. The disease is very contagious, and, depending upon the conditions, may affect every litter on a property.

At the request of the Chief Inspector of Stock the writer undertook an investigation into the nature and cause of the disease. The investigation was carried out in the field in collaboration with the Principal Veterinary Officer, Mr. C. V. Loxton, B.V.Sc., and in the laboratory. The following is a brief description of the results of the investigation:—

OCCURRENCE.

The disease has only been met with during the warmer months of the year.

AGE INCIDENCE.

Only young animals have been found affected. Although the whole of a litter may be severely affected, the mother has never been found to show any lesions whatsoever. The disease has been found most commonly in sucking pigs about two or three weeks old. Although the lesions may not appear until later than this, it is doubtful whether any case occurs after the tenth week.

SYMPTOMS.

The first sign of the disease is the appearance of small lesions in the skin. These are seen most commonly on the belly, behind the shoulder, on the thighs, and the under surface of the neck, although they may occur scattered irregularly over the body, head, and limbs. The lesion starts as a minute elevation in the skin, which rapidly enlarges, and takes a circular shape. The skin in the centre is roughened; the edges are usually sharply defined and rounded. The lesion is characteristically circular, raised, and discoid. The centre is at first denuded of the superficial layer of epithelium and covered by a crust. Later there is hypertrophy of the epithelium, with excessive keratinisation, a somewhat warty condition developing, which eventually covers the whole area except the edge, which is clean, raised, and rounded. The lesions vary in size from points just visible to the naked eye to areas of 15mm. ($\frac{3}{4}$ in.) in diameter, or even larger. Sometimes an area of congestion is seen surrounding the lesion.

There is rarely any discharge, but there is sometimes a slight oozing of a straw-coloured liquid, which rapidly dries on the surface. When the lesions are very numerous and crowded together a somewhat corrugated appearance is produced. Cracks may appear in or between the lesions in this case, and a purulent discharge (pus) develop.

At first the affected animals show little distress beyond a moderate pruritus or irritability of the skin. A little later they begin to lose condition, but this is not usually marked. They become less active, and show some shortness of breath. Usually a diarrhoea sets in, which lasts for a few days, when death occurs often quite suddenly, the tips of the ears and dependent parts becoming cyanosed (blue). Death occurs usually in from one to three weeks after the first appearance of the lesions.

In the more chronic cases the animals may become very emaciated before death. It is usual to find a mortality of 100 per cent. of affected animals, but some cases showing very few lesions may eventually recover. All of the cases observed have been found to harbor lice (*Haematopinus suis*), although not usually in great numbers.

POST-MORTEM APPEARANCES.

Apart from the typical skin lesions, there are usually well marked changes to be found in the internal organs. The same organs are not always attacked, and the appearances vary considerably in animals from the same litter, showing the same degree of infection—i.e., there is no typical *post-mortem* appearance to be found.

Thoracic Cavity.—The heart is usually found to be pale in colour and flabby. There are often areas of consolidation in the lungs (lobar pneumonia). Both lungs are usually affected, and the same lobes in either lung.

Abdominal Cavity.—The liver is large and usually mottled in appearance, and often showing on the surface numerous pin-point, whitish-coloured dots. The mottling is due to the occurrence of diffuse greyish-coloured areas. On section the greyish areas and small dots are seen to extend deeply into the substance of the organ, but are more frequent nearer the surface. The liver is usually paler than normal. The stomach is found to be normal; the small intestine is sometimes catarrhal. The kidneys usually show marked changes. On looking at the surface it is seen to be studded with petechial ("fleabite") hæmorrhages. On section these hæmorrhages are seen to extend throughout the cortex of the organ. At other times the kidney is seen to be intensely hæmorrhagic throughout. Sometimes the kidneys show no hæmorrhagic changes, but are much paler than normal. The spleen is usually large, but shows no marked changes. The mesenteric lymph glands are often very large and very hæmorrhagic. At other times they show the same change to a less degree. The superficial inguinal glands are often enlarged and hæmorrhagic.

BACTERIOLOGICAL EXAMINATION.

The majority of the animals examined have shown bacteria in the blood and tissues of the body. In most cases a bacillus giving the cultural and serological reactions of the *Bacillus enteritidis* (Gaertner) has been isolated from the blood and

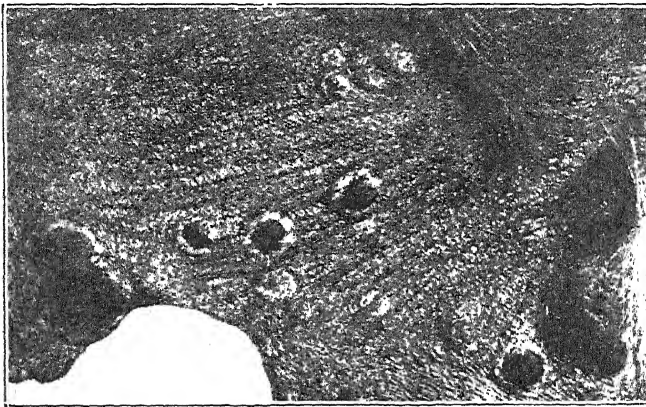


PLATE 30.

Photograph of the skin of an affected animal showing lesions in various stages of development. In the centre of the photograph are to be seen smaller lesions, typical in appearance, and showing distinctly the clean, raised edge. On the right side are to be seen two older lesions which have become fused. On the left hand side is to be seen one still older lesion. Note that the older and larger the lesion the less pronounced is the clean edge. (Photograph from a preserved specimen. Natural size.)

internal organs, and mixed with staphylococci and streptococci from the skin lesions. In other cases a streptococcus has been found associated with the *B. enteritidis* (Gaertner) in the blood and internal organs. In one mild case showing few skin lesions the blood and internal organs were found to be sterile.

In several cases the contents of the large bowel were examined for the presence of the *B. enteritidis* (Gaertner), but in no case was the micro-organism detected.

EXPERIMENTAL INVESTIGATION.

Four young pigs (Middle York) were taken from the mother and fed artificially. They were kept under observation for about a week, and as they remained healthy and developed normally, they were subjected to the following experiments:—

Experiment 1.—Lice (*Hæmatopinus suis*) were transferred from an affected animal to one of the experimental animals. About a week or ten days later characteristic lesions were found near the right shoulder, on the back, and on the belly. These lesions presented the characteristic appearances of lesions found in affected animals in the field. Bacteriological examination of the lesions revealed the presence of streptococci and staphylococci, but no bacilli. The animal was kept strictly isolated during the period of the experiment. Apart from the skin lesions the animal presented nothing abnormal. The lesions, which were few in number, gradually disappeared, no sign of them remaining six weeks after they were first observed.

Experiment 2.—An area of the skin along the belly of an experimental animal was lightly scarified and a skin lesion from an affected animal was rubbed into the spot. Nine days later small vesicles appeared on the area inoculated. These later took on the appearances characteristic of lesions found in naturally infected animals, although more crowded and not developing to the same size. The animal was kept strictly isolated during the period of the experiment. It showed no evidence of any ill-health, and gradually the skin lesions disappeared.

Experiment 3.—A young pig was inoculated subcutaneously with 3cc. of defibrinated blood collected from an animal showing very few skin lesions. This blood, on later examination, was found to be sterile. The animal was kept strictly isolated during the course of the experiment. It remained healthy and developed normally.

Experiment 4.—Two affected animals were kept in a pen for several days. The pen was purposely not cleaned during this time. The affected animals were removed and a healthy young pig placed in the pen. The animal was kept under observation for about two months. It remained healthy and developed normally.

DISCUSSION.

Although the investigation was necessarily somewhat limited in extent, and many points remain undetermined, it can reasonably be claimed that certain factors in relation to the disease have been elucidated. There seems to be no doubt that the disease is essentially a skin disease due to the inoculation of bacteria into the skin, where they grow and produce lesions with a very characteristic appearance. From the experimental observations and those carried out in the field it may reasonably be concluded that lice are responsible for this inoculation. Each lesion represents a separate inoculation of bacteria into the skin. When they are close together and numerous the lesions tend to fuse, but they always start as a minute elevation in the skin, which extends in a circular fashion.

There is no evidence to show that the skin becomes inoculated by any other means, although there is no reason to believe that this is not possible. Only the soft and tender skin of the young animal appears to be susceptible. The thicker and harder skin of the old animals appears to offer complete protection. That skin lesions are not the external manifestation of a systematic disease has been shown by the results of the experimental inoculations and the bacteriological examinations of affected animals.

Although a general infection results in the majority of cases, this appears to be due to the lowering of the resistance of the animal following the inflammatory trouble of the skin. Although the *Bacillus enteritidis* (Gaertner) is the micro-organism which is directly responsible for the serious condition and death of the animal, its presence is not essential for the production of the skin lesions. This is shown by the fact that the bacillus was not isolated from lesions produced experimentally. The skin lesions appear to be due to the inoculation into the skin of staphylococci and streptococci. Usually other micro-organisms are associated with these cocci, and may produce serious complications.

The *B. enteritidis* (Gaertner) and the streptococcus appear to be capable of invading the blood stream and internal organs after the resistance of the animal becomes lowered. This invasion probably takes place from the foci of infection in the skin. It has not been possible to determine whether the fatal termination of the disease depends directly upon the presence of *B. enteritidis*. The determination of this point is only possible after the investigation of many separate outbreaks. The opinion is held, however, that, given the absence of this bacillus, a milder type of disease would result, with few or no deaths.

PREVENTION.

Prevention of the disease should prove easy if sufficient care and attention are given to the management of young animals. They should always be kept in clean surroundings, where they can obtain a sufficiency of exercise in the fresh air and sunlight. A strict watch should be kept on adult and young animals for the appearance of any lice. Should any lice be detected, efficient methods for their eradication should be adopted.

Whenever lice are found on the animals their quarters should be thoroughly cleaned and disinfected. The animals themselves should be dipped, sprayed, or hand-dressed. A 2 to 4 per cent. creolin solution is useful for this purpose. A 10 per cent. kerosene solution is very efficient, but should not be used in the very hot weather, when it is liable to seriously injure the skin.

All treatments must be repeated at least three times at intervals of a week to ten days. The addition of creolin to hog wallows from time to time will be found to keep the animals comparatively free from lice. It is probable that, in the absence of lice, the disease will be absolutely unknown.—“Journal of Agriculture of South Australia.”

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR OCTOBER, 1918.

Article.						OCTOBER.
						Prices.
Bacon	...	...	...	...	lb.	9d. to 10d.
Barley	...	...	...	...	bush.	4s. 9d.
Bran	...	...	...	...	ton	£7 5s. to £7 10s.
Broom Millet	...	...	...	...	"	£30 to £50
Broom Millet (Sydney)	...	...	...	...	"	£40 to £50
Butter (First Grade)	...	...	...	...	cwt.	149s. 4d.
Chaff, Mixed	...	...	...	...	ton	£6 to £7 10s.
Chaff, Oaten	...	...	...	...	"	£7 to £8 15s.
Chaff, Lucerne	...	...	...	...	"	£12 to £14
Chaff, Wheaten	...	...	...	...	"	£6 10s. to £7 10s.
Cheese	...	...	...	...	lb.	11½d.
Flour	...	...	...	...	ton	£12
Hams	...	...	...	...	lb.	1s. 6d. to 2s.
Hay, Lucerne	...	...	...	...	ton	£8 to £11 10s.
Hay, Oaten	...	...	...	...	"	...
Hay, Wheaten	...	...	...	...	"	...
Honey	...	...	...	...	lb.	8d. to 9d.
Maize	...	...	...	...	bush.	5s. 8d. to 5s. 9d.
Oats	...	...	...	...	"	3s. 3d. to 4s.
Onions	...	...	...	...	ton	£26 to £28
Peanuts	...	...	...	...	lb.	8d. to 10d.
Pollard	...	...	...	...	ton	£5
Potatoes	...	...	...	...	"	£8 7s. 6d. to £12 10s.
Potatoes (Sweet)	...	...	...	...	cwt.	4s. to 4s. 6d.
Pumpkins (Table)	...	...	...	...	"	10s. to 12s.
Pumpkins (Cattle)	...	...	...	...	ton	£12 10s. to £13 10s.
Sugar-cane Fodder	...	...	...	...	"	55s.
Eggs	...	...	...	...	doz.	8d. to 10½d.
Fowls	...	...	...	...	per pair	4s. to 6s. 6d.
Ducks, English	...	...	...	...	"	3s. 9d. to 4s.
Ducks, Muscovy	...	...	...	...	"	3s. 6d. to 6s. 6d.
Geese	...	...	...	...	"	8s. to 10s.
Turkeys (Hens)	...	...	...	...	"	10s. to 13s.
Turkeys (Gobblers)	...	...	...	...	"	18s. to 25s.
Wheat (Milling)	...	...	...	...	bush.	4s. 6d. to 4s. 9d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen boles	...	...	...	...	...	6s. to 10s.
Beans, per sugar-bag	...	...	...	...	...	10s. to 13s. 9d.
Beetroot, per dozen bunches	...	...	...	...	...	1s. to 2s.
Cabbages, per dozen	...	...	...	...	...	3s. to 15s.
Carrots, per dozen bunches	...	...	...	...	...	1s. to 2s.
Cauliflowers, per dozen	...	...	...	...	...	5s. to 10s.
Chokos, per quarter-case	...	...	...	...	...	...
Cucumbers, per dozen	...	...	...	...	...	1s. 6d. to 2s.
Lettuce, per dozen	...	...	...	...	...	9d. to 1s.
Marrows, per dozen	...	...	...	...	...	7s. 5d. to 10s.
Parsnips, per dozen bunches	...	...	...	...	...	1s. to 2s.
Peas, per sugar-bag	...	...	...	...	...	8s. to 13s.
Sweet Potatoes, per cwt.	...	...	...	...	...	1s. 6d. to 4s.
Table Pumpkins, per cwt.	...	...	...	...	...	10s. to 12s.
Tomatoes, per quarter-case	...	...	...	...	...	5s. to 8s.

SOUTHERN FRUIT MARKETS.

Article.	OCTOBER.	
	Prices.	
Bananas (Queensland), per case	10s. to 23s.	
Bananas (Tweed River), per case	15s. to 19s.	
Bananas (Fiji), per bunch	6s. to 8s. 6d.	
Bananas (G.M.), per bunch	6s. to 8s.	
Bananas (G.M.), per case	20s. to 22s.	
Lemons, per bushel-case	4s. to 7s.	
Mandarins, per bushel-case	18s.	
Oranges (Navel), per bushel-case	14s. to 18s.	
Oranges (Other), per case	8s.	
Oranges (Queensland), per case	8s. to 10s.	
Papaw Apples, (Queensland), per double-case	12s.	
Passion Fruit, per half-case	10s. to 20s.	
Pears, per bushel case ... ..	...
Pineapples (Queens), per double-case	8s. to 11s.	
Pineapples (Ripleys), per double-case	6s. to 9s.	
Pineapples (Common), per double-case	5s. to 8s.	
Tomatoes, per half-case	2s. to 6s.	

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per case	10s. to 13s. 6d.
Apples, Cooking, per case	10s. to 12s. 6d.
Bananas (Cavendish), per dozen	2d. to 7d.
Bananas (Sugar), per dozen	2d. to 5d.
Cape Gooseberries, per quart	9d.
Citrons, per hundredweight	16s.
Cocoanuts, per sack	15s. to 25s.
Cunquats, per quarter-case ... ..	...
Custard Apples, per quarter-case ... ..	...
Lemons (Lisbon), per case	8s. to 12s.
Mandarins, per case	10s. to 15s.
Oranges (Navel), per case ... ..	...
Oranges (Seville), per hundredweight	12s.
Oranges (Other), per case	6s. to 10s.
Papaw Apples, per quarter-case	1s. to 2s. 6d.
Passion Fruit, per half-case	8s. to 10s.
Peanuts, per lb.	8d. to 10d.
Pineapples (Ripley), per dozen	1s. 6d. to 5s.
Pineapples (Rough), per dozen	1s. to 5s.
Pineapples (Smooth), per dozen	2s. to 3s. 6d.
Strawberries, per tray	1s. to 2s.
Strawberries, per dozen boxes	3s. 6d. to 9s.
Tomatoes, per quarter-case	5s. to 8s.

TOP PRICES, ENOGGERA YARDS, SEPTEMBER, 1918.

Animal.	SEPTEMBER.	
	Prices.	
Bullocks	£24 5s. to £29 2s. 6d.	
Cows	£17 to £20 15s.	
Merino Wethers	49s.	
Crossbred Wethers	43s. 6d.	
Merino Ewes	34s. 3d.	
Crossbred Ewes	32s. 3d.	
Lambs	31s. 3d.	
Pigs (Bacon)	81s.	
Pigs (Porkers)	41s.	

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF SEPTEMBER, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING SEPTEMBER, 1918 AND 1917, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Sept.	No. of Years' Records.	Sept., 1918.	Sept., 1917.		Sept.	No. of Years' Records.	Sept., 1918.	Sept., 1917.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
Atherton ...	0·62	17	Nil	0·48	Nambour ...	2·54	22	3·46	5·30
Cairns ...	1·71	36	0·89	1·00	Nanango ...	2·01	36	1·30	7·11
Cardwell ...	1·45	46	0·81	1·12	Rockhampton ...	1·41	31	0·38	3·68
Cooktown ...	0·57	42	0·62	0·12	Woodford ...	2·24	31	0·98	4·14
Herberton ...	0·48	31	0·08	0·02					
Ingham ...	1·08	26	0·52	1·25	<i>Darling Downs.</i>				
Innisfail ...	3·63	37	2·65	2·51	Dalby ...	1·85	48	0·60	5·82
Mossman ...	1·08	10	...	1·18	Emu Vale ...	2·06	...	Nil	7·02
Townsville ...	0·79	47	0·19	0·23	Jimbour ...	1·75	...	0·38	6·58
					Miles ...	1·83	33	0·38	5·92
<i>Central Coast.</i>					Stanthorpe ...	2·56	45	0·33	7·28
Ayr ...	1·69	31	0·19	0·22	Toowoomba ...	2·31	46	0·50	6·62
Bowen ...	0·85	47	0·69	0·18	Warwick ...	2·02	31	0·05	6·90
Charters Towers ...	0·83	36	0·50	0·71					
Mackay ...	1·54	47	0·53	0·70	<i>Maranoa.</i>				
Proserpine ...	2·18	15	0·37	1·45	Roma ...	1·65	44	0·24	7·25
St. Lawrence ...	1·38	47	0·61	2·59					
					<i>State Farms, &c.</i>				
<i>South Coast.</i>					Bungewongorai ...	2·33	4	Nil	7·07
Biggenden ...	1·84	...	0·29	4·51	Gatton College ...	1·87	...	0·52	7·50
Bundaberg ...	1·93	35	0·47	3·54	Gindie ...	0·95	...	0·51	3·57
Brisbane ...	2·09	67	1·98	5·21	Hermitage ...	1·88	...	Nil	6·56
Childers ...	2·12	23	0·82	3·98	Kairi ...	1·07	4	0·08	0·66
Crohamhurst ...	2·53	25	3·45	5·81	Kamerunga ...	1·23	...	...	0·70
Esk ...	2·44	31	0·73	7·16	Sugar Experiment Station, Mackay	1·40	...	0·46	0·60
Gayndah ...	1·64	47	0·26	5·28	Warren ...	1·08	4	0·55	3·70
Gympie ...	2·18	48	2·95	3·57					
Glasshouse M'tains	2·24	10	1·55	5·60					
Kilkivan ...	1·82	39	0·07	4·17					
Maryborough ...	2·01	47	1·75	3·63					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for September this year, and for the same period of 1917, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

CLOSE SEASON FOR OPOSSUMS AND BEARS.

Trappers and shooters of bears and opossums should note that the season for their operations as far as opossums are concerned closed on 31st October. Persons, however, who killed up to that date will be permitted to remove the skins by rail up to and including 14th November. The close season for native bears remains in force until 30th April, 1919, and, therefore, the carriage of the skins of these animals is prohibited until that date.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		PHASES OF THE MOON.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6.3	5.34	5.29	5.47	4.59	6.5	4.46	6.28	<p>The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.</p> <p>H. M.</p> <p>5 Sept. ● New Moon 8 44 p.m.</p>
2	6.2	5.34	5.27	5.47	4.58	6.5	4.46	6.28	
3	6.1	5.35	5.26	5.48	4.57	6.6	4.46	6.29	
4	6.0	5.35	5.25	5.48	4.56	6.7	4.46	6.30	
5	5.59	5.36	5.24	5.49	4.55	6.8	4.46	6.31	
6	5.58	5.36	5.22	5.50	4.54	6.9	4.46	6.32	<p>14 „ ☾ First Quarter 1 3 a.m.</p> <p>20 „ ○ Full Moon 11 1 p.m.</p> <p>27 „ ☽ Last Quarter 2 39 p.m.</p> <p>The Moon will be farthest from the earth on the 8th, and nearest to it on the 21st.</p>
7	5.57	5.36	5.21	5.50	4.54	6.9	4.46	6.32	
8	5.56	5.37	5.20	5.51	4.53	6.10	4.46	6.33	
9	5.54	5.37	5.19	5.51	4.53	6.10	4.46	6.34	
10	5.53	5.38	5.18	5.52	4.52	6.11	4.47	6.35	
11	5.52	5.38	5.17	5.52	4.52	6.12	4.47	6.35	<p>5 Oct. ● New Moon 1 5 p.m.</p> <p>13 „ ☾ First Quarter 3 0 p.m.</p> <p>20 „ ○ Full Moon 7 35 a.m.</p> <p>27 „ ☽ Last Quarter 3 35 a.m.</p> <p>The Moon will be farthest from the earth on the 6th, and nearest to it on the 20th.</p>
12	5.51	5.39	5.16	5.52	4.51	6.13	4.47	6.36	
13	5.50	5.39	5.16	5.53	4.51	6.13	4.48	6.36	
14	5.49	5.40	5.15	5.53	4.50	6.14	4.48	6.37	
15	5.47	5.40	5.15	5.53	4.50	6.15	4.49	6.37	
16	5.46	5.41	5.14	5.54	4.49	6.16	4.49	6.38	<p>4 Nov. ● New Moon 7 2 a.m.</p> <p>12 „ ☾ First Quarter 2 46 a.m.</p> <p>18 „ ○ Full Moon 5 33 p.m.</p> <p>25 „ ☽ Last Quarter 8 25 p.m.</p> <p>The Moon will be farthest from the earth on the 2nd and 20th, and nearest on the 17th.</p>
17	5.45	5.41	5.13	5.54	4.49	6.17	4.50	6.38	
18	5.44	5.41	5.12	5.55	4.48	6.17	4.50	6.39	
19	5.43	5.42	5.11	5.55	4.48	6.18	4.50	6.39	
20	5.42	5.42	5.10	5.56	4.48	6.19	4.51	6.40	
21	5.41	5.43	5.9	5.56	4.48	6.20	4.51	6.40	<p>4 Dec. ● New Moon 1 19 a.m.</p> <p>11 „ ☾ First Quarter 12 31 p.m.</p> <p>18 „ ○ Full Moon 5 18 a.m.</p> <p>25 „ ☽ Last Quarter 4 31 p.m.</p> <p>The Moon will be nearest to the earth on the 15th, and farthest from it on the 27th.</p> <p>There will be an annular or ring-shaped Eclipse of the Sun on 3rd December, but it will not be visible in Australia.</p>
22	5.40	5.43	5.8	5.57	4.47	6.21	4.52	6.41	
23	5.39	5.44	5.7	5.58	4.47	6.21	4.52	6.41	
24	5.37	5.44	5.7	5.58	4.47	6.22	4.53	6.42	
25	5.36	5.44	5.6	5.59	4.47	6.23	4.54	6.42	
26	5.35	5.45	5.5	5.59	4.46	6.24	4.54	6.43	
27	5.33	5.45	5.4	6.0	4.46	6.25	4.55	6.43	
28	5.32	5.46	5.3	6.1	4.46	6.25	4.55	6.44	
29	5.31	5.46	5.2	6.2	4.46	6.26	4.56	6.44	
30	5.30	5.46	5.1	6.3	4.46	6.27	4.56	6.45	
31	...	...	5.0	6.4	...	...	4.57	6.45

For places west of Brisbane, but nearly on the same parallel of latitude— $27\frac{1}{2}$ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, and November may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night, when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Orchard Notes for December.

THE SOUTHERN COAST DISTRICTS.

December is somewhat an off month for pines, though bananas should be improving both in quality and quantity. The purely tropical summer ripening fruits are not yet ready, and, consequently, there is only a limited supply of fruit in this part of Queensland during the month.

Early ripening varieties of grapes will mature, and care should be taken to market them in good order. The first fruit to ripen should be put up in small packages, as, if marketed in this manner, it will fetch a better price, but as it becomes more plentiful it can be packed in larger cases.

Pay particular attention during the month to all peaches, apples, pears, Japanese plums, or other fruits that are liable to be attacked by fruit fly, and see that no fly-infested fruits are allowed to lie about under the trees, and thus breed out a great crop of flies that will be ready to destroy the grape and mango crops as they mature.

If the month is dry, see that the orchard is kept well worked so as to retain moisture in the soil, and, in any case, even should there be a good rainfall, it is necessary to cultivate in order to keep down weed growth, as if weeds are not kept in check now there is little chance of their being kept in hand once the January and February rains set in.

The planting out of pineapples, bananas, and most kinds of tropical fruits can be carried out during the month, especially if there is any rainy weather; but, if the weather is dry, it is better to defer the planting out of tropical fruits till January or February.

The cyaniding of citrus trees can be continued when necessary, and where Maori or orange mite is showing it should be checked at once, as Maori fruit is of no use for the Southern markets, and is unsuitable for export to the old country.

THE TROPICAL COAST DISTRICTS.

Clean up all orchards and pineapple and banana plantations as long as you have the chance of fine weather, so as to have your land in good order when the wet season commences, as once the rain sets in there is little chance of fighting weeds. Watch bananas carefully for fly, and market the fruit in good order. Handle the crop of pines carefully; don't let the fruit get too ripe, as an over-ripe Northern pine is tasteless. The fruit should be cut as soon as it is fully grown, as even when quite green the rough-leaf varieties have usually developed sufficient sugar to suit most persons' taste. Pack carefully to prevent bruising, and they will carry South in good order.

Only send high-class mangoes South—bad-flavoured sorts, and stringy, carrotty, or turpentine flavoured varieties are not worth shipping. High-class fruit will pay to handle carefully, but there is no demand for rubbish, and I am sorry to say that fully 90 per cent. of the mangoes grown in the State must be classed under the latter heading.

Tropical fruits of all kinds can be set out during suitable weather. Fruit pests of all sorts must be systematically fought.

THE SOUTHERN AND CENTRAL TABLELANDS.

December is a busy month for the growers in the Stanthorpe district. Early apples, plums, peaches, nectarines, &c., will ripen during the month, and must be marketed as soon as ripe, as they do not keep long once they are gathered. Handle carefully, and grade better; there is far too much early rubbish dumped on to the local markets, which tends to spoil the demand as well as the price. Watch the orchards very carefully for codling moth and fruit fly, and take every possible precaution to keep these pests in check should they make their appearance, as the future cleanliness of the orchard depends very largely on the care that is taken now to keep these pests in check.

If the month is dry, keep the orchard and vineyard well cultivated. Watch the vines carefully so as to detect the first signs of Oidium or Anthracnose, and systematically fight these pests, remembering always that in their case prevention is better than cure, and that only prompt action is of the slightest value.

On the Darling Downs every care must be taken to keep the fruit-fly in check, and on no account must infested fruit be allowed to lie about under the trees, as this is far and away the best method of propagating the pest wholesale.

In the Central District the grape crop will ripen during the month. Handle the fruit carefully. Cut it when dry, and where it has to be sent long distances to market pack in 6-lb. baskets rather than in larger cases. Where dry keep the orchard and vineyard well cultivated, and where the citrus and other fruit trees require it give them an irrigation. Don't irrigate grapes once the seeds have been formed, as it tends to deteriorate the quality, and to make the fruit tender and consequently to carry badly.

Farm and Garden Notes for December.

Too much care can scarcely be bestowed upon potatoes dug up this month to protect them from the sun. They should be dug or ploughed out as soon as the skin is firm, as they are liable to rot in the ground owing to the great heat.

FIELD.—The wheat harvest will be now nearing completion. The estimates of the probable yield have varied so considerably that it will be well to wait until the entire harvest is over before speculating on the result. This State is a long way from becoming a wheat-exporting country. The principal factor operating against a still greater extension of the wheatgrowing industry is that many farmers who formerly grew wheat and barley have turned their attention to dairying, which offers larger and quicker returns.

Given favourable weather, maize, panicum, imphee, kafir corn, and the various millets may be sown.

Cotton sown in October and November will be making headway but slowly, owing to the lack of September and October rains. Keep down all weed growth by scarifying as long as the growth will admit of horse work. Tree cottons, such as Sea Island and Caravonica, should be topped and pruned.

KITCHEN GARDEN.—Gather cucumbers, melons, vegetable marrows, and French beans as soon as they are fit for use. Even if they are not required, still they should be gathered, otherwise the plants will leave off bearing. Seeds of all these may be sown for a succession. Sow cabbage and cauliflower seed. Great difficulty will be experienced in getting these to grow at this season, and the plants will consequently be more valuable in proportion. Tomatoes should be in full bearing, and the plants should be securely trained on trellises or stakes. Take up onions, and spread them out thinly on the barn floor until the tops wither sufficiently to pull off easily. They should then be graded into sizes, and sent to market or stored in a cool place. Where there is an unlimited supply of water, and where shade can be provided, lettuce and other salad plants may still be sown. All vacant ground should be well manured and dug two spits deep. Manure and dig as the crops come off, and the land will be ready for use after the first shower.

FLOWER GARDEN.—Keep the surface of the land well stirred. Do not always stir to the same depth, otherwise you are liable to form a "hard pan," or caked surface, beneath the loose soil. Alternate light with deep hoeings. A few annuals may still be planted, such as balsams, calendulas, cosmos, coreopsis, marigold, nasturtium, portulaca, zinnia, and cockscomb. Plant out whatever amaranthus may be ready. These may still be sown in boxes. Clear away all annuals which have done flowering. Bulbs should have all the dead leaves cut away, but the green leaves should not be touched. Stake chrysanthemums, and, as the flower buds develop, give them weak liquid manure. Coleus may now be planted and propagated from cuttings. Dahlias are in various stages, but the greater part will have been planted by this time. Give them liquid manure, and never let them dry up. Lift narcissus about the end of the year, but do not store them. Plant them out at once in their new positions. Top-dress all lawns.

GOVERNMENT AGRICULTURAL LABORATORY.

INSTRUCTIONS FOR THE COLLECTION OF SAMPLES, AND
SCALE OF FEES.

GENERAL INSTRUCTIONS.

1. All analyses will be carried out in the order in which the samples are received at the Laboratory, with the exception of perishable substances, which will be analysed immediately after arrival.

2. Should any person wish for an immediate analysis, the fee, charged in accordance with the scale of fees below, will be increased by 50 per cent.

3. The samples may be forwarded by parcel post or by rail, carriage paid, to the

Under Secretary for Agriculture and Stock, Brisbane.

In all cases a letter, giving full instructions as to the information required, and enclosing the prescribed fee, must be sent at the same time.

4. Analyses will only be carried out if these instructions are adhered to, and if the samples are taken in accordance with further instructions issued below.

5. The Under Secretary may, under special circumstances, modify the fees charged for analytical work.

	SCALE OF FEES.			For Farmers, &c.*		
	£	s.	d.	£	s.	d.
Butter, Cheese, Condensed Milk—commercial analysis ..	1	1	0			
Butter, Cheese, Condensed Milk—complete analysis ..	2	2	0			
Butter, Cheese—Estimation of boric acid, or moisture ..	0	5	0			
Cream and Milk—Estimation of fat only ..	0	5	0	0	2	6
Cream and Milk—Estimation of fat, total solids, and test for preservatives	1	1	0			
Dipping Solutions, prickly-pear destroyers—test for arsenic only	0	10	6	free†		
Fertilisers—Determination only of—						
Lime	0	10	0	0	3	0
Nitrogen, total nitrogen, nitrate nitrogen, ammonia salts, or otherwise (each)	0	12	6	0	3	0
Phosphoric acid—water soluble, citric acid soluble, or total phosphoric acid (each)	0	15	0	0	3	0
Potash	0	15	0	0	3	0
Fat	0	10	0	0	3	6
Degree of fineness	0	10	0	0	3	0
Analysis of—						
Blood manure, or dried blood	0	15	0	0	3	0
Bone dust, or bone meal	1	10	0	0	6	0
Guano, rock phosphates	2	0	0	0	10	6

* Reduced fees apply only to such residents in Queensland whose main source of income is from agricultural, pastoral, and horticultural pursuits.

† Dipping fluids are analysed free of charge for the owners of all registered dips.

QUEENSLAND AGRICULTURAL JOURNAL

VOL. X.

DECEMBER, 1918.

PART 6.

Agriculture.

THE ELECTRIFICATION OF SEEDS.

The following article from an English paper will doubtless be interesting to some of our readers. The electrifying of seeds of wheat has for some years engaged the attention of scientific agriculturists in Europe, and lately some remarkable results have been recorded, as here stated. The process has now reached a crucial stage.

Begun half a dozen years ago in a few pots, it was next extended to a plot of garden ground. In the following season a couple of farmers grudgingly gave up to it a few small plots of agricultural land. Surprised by the result, they and one or two more tried it the next season on a few acres. Again the result was encouraging, and more farmers sowed the seed upon larger acreages. The results were of such a character that the news spread far and wide, and at the present time more than 2,000 acres of corn grown from electrified seed are waiting to be harvested.

A number of representatives of foreign and colonial Governments and agricultural experts have visited many of the farms in Dorset on which electrified and unelectrified seeds of the same sample are growing side by side in the same fields, and this is what they saw. A square yard of electrified wheat was measured off by Captain Rawlence, a professional surveyor, in the presence of the visitors, and in their presence reaped and tied up in a sheaf. Another square yard of unelectrified wheat growing in the same field was then treated in the same way. The two sheaves were taken into Dorchester by the visitors and there weighed in their presence, and it was found that the unelectrified sheaf weighed $4\frac{1}{2}$ lb.; the electrified sheaf $7\frac{1}{4}$ lb.

In every case the straw growing from the electrified seed was longer by some inches than the straw growing from the untreated seed. In every case the ears of the electrified wheat and barley were longer, plumper, and appeared to contain more berries or seeds than the unelectrified, the heads of the oats were larger, and the florets more numerous. In some fields in which the untreated corn had been laid in patches by recent thunder showers, the whole of the electrified corn was standing upright, the straw being not only longer but stouter.

Experienced agriculturists estimated the increase of yield of the electrified crops at from two to three sacks per acre. An increase of two sacks per acre on an average crop of wheat would be 25 per cent. In 1915, rather more than two million tons of wheat were produced in the United Kingdom. If the electrifying process

should be universally adopted it seems that the quantity produced would be increased by half a million tons, that the food of the country and the wealth of the farmers would be increased by this amount, that half a million tons of freight and many more tons of shipping would be saved on wheat alone. The result of the thrashing should be interesting.

THE COTTON CROP OF 1918.

That cotton-growers in 1916 were satisfied with the returns from their crops, is evidenced by the fact that, whereas in that year only 75 acres were under cotton cultivation, the following year saw 133 acres planted. The area sown in 1918 does not appear in the report of the Government Statistician, which only supplies returns to December, 1917. In the two seasons mentioned the respective returns of seed cotton were given as 24,264 lb. and 76,656 lb. respectively. The quantity of seed cotton delivered by farmers at the departmental ginnery in 1918 amounted to 166,458 lb., which produced 54,280 lb. of lint, or, approximately, the proportion of lint was one-third the weight of the seed cotton. The whole of the ginned cotton was sold at 1s. 1d. per lb. except only a small portion of second grade. The farmers received, on delivery of their crop, an advance of 2d. per lb. The price obtained for the lint enabled the payment of a further 2d. per lb., making the total payment for raw cotton at the farm 4d. per lb. The Department had, however, since the previous year, installed a "Linter" machine, by which means the short lint remaining on the seed of Upland cotton was saved to the extent of between $2\frac{1}{2}$ and $3\frac{1}{2}$ per cent. This may enable the Department to pay a little more to the suppliers.

In the old days of cotton-growing in the State, the gin houses paid 3d. per lb. to the growers, and a glance at the records of the return of a cotton crop to farmers will show that, at that price, this crop paid far better than any other. Certainly wages in the old days were considerably lower than at present but, as of old, many farmers keep the picking (valued at 4d. per lb.) in their own families, thus equalising expenses, and increasing the value of the crop.

A fair crop of seed cotton is 1,000 lb. per acre, but in the Moreton districts, far larger yields have been obtained (up to 2,000 lb.), and the net return ranged from £5 16s. 10d. to £15 3s. 3d. per acre. The results of the 1918 crop go to show that a cotton field large or small will return to the farmer more than any other crop, and with less labour.

MARKET GARDENING.

WHEN TO PICK TOMATOES.

It is not generally known that tomatoes ripen and colour from within outward. The fruits will acquire a perfect colour if they are picked as soon as they have grown to full size. They should be spread out in the sunshine for a time. When the surface colour begins to change from a dark green to a distinctly lighter shade with a very little tinge of pink, the fruit may be picked. Such fruit, if wrapped carefully in paper, will carry long distances, and ripen during the journey, opening up almost perfect.

One who has only a few plants may secure beautiful fruits free from cracks and of splendid colour by enclosing the fruits in paper bags some weeks before they ripen.

Tomatoes only acquire their most perfect flavour when ripened on the vine in full sunlight. No fruit artificially ripened is equal to that ripened by the sun.

It requires a great deal of experience to know exactly when to pick tomatoes. Fruit that has to be sent on a long journey must be gathered before that which has only a short distance to travel. Generally speaking, the fruit should be left on the vine no longer than will permit of its becoming fully ripe by the time it reaches its destination, where it is exposed for sale. When the fruit is to be shipped any distance frequent pickings are necessary to secure the fruit in the right condition. When the markets are close it is always an advantage not to gather until the fruit

is well coloured and before it begins to soften. Great care must be taken not to mark or bruise the fruit. Care should be taken to grade the fruit and so make it more attractive for sale. It should be graded as to size, shape, and colour. It will always pay to grade the fruit carefully. Careful grading and packing have great influence on the price. In our State very little care is taken with tomatoes. We see the fruit exposed for sale in the barrows, hand carts, and elsewhere; no attempt being made to make the fruit attractive.

When ripe, tomatoes require most careful handling, as they are easily bruised when roughly treated. It is not uncommon to see boxes of fruit most roughly handled in the market, and emptied from case to case as if they were as hard as stones. No wonder they have lost their flavour before reaching the consumer. Australians have a lot to learn about marketing fruit.

Tomato Weevil.—These little creatures attack the tomato plants at night. The weevil belongs to the same family as the curculio. It does much damage both in the grub and beetle stages. It feeds on the leaves at night and hides in the soil during the day. It is an easy matter to catch the grub. Spread a sheet under the plants, then let the bright light of a lantern shine on the plant; the weevils immediately fall on the sheet and are easily killed. Some people get success by making a bait of arsenic and bran. This is spread near the base of the plants. Don't allow chickens to have the run of the garden while the baits are about.

Cut Worms.—These do considerable damage to young tomato plants. The best remedy is a poisoned bait made thus: 1 lb. of arsenic, 1 lb. sugar, 6 lb. of bran. Mix with enough water and make a mash. Spread this about the base of the plants.

A solution of arsenate of lead to 50 gallons of water, when sprayed on the foliage, will kill all leaf-eating beetles and grubs.

Cracking of the Fruit.—Cracks and fissures in the mature fruit are due to variations in water supply. Some varieties are very liable to this disease. The grower should cultivate thoroughly and so prevent sudden checks in growth. If the development of the fruit has been checked by dry weather conditions and abundant supply of water follows, the outer skin cannot keep pace with the expanding fruit, and so cracking ensues.—“Garden and Field.”

VARIOUS MANURES FOR ROSES.

Whatever other manures you choose to apply you must use cow manure, if possible, well decayed and lightly pointed into the soil after you have pruned them in spring. Plenty of this should, of course, have been worked into the ground before planting them. Cow manure is slower in its action and cooler than horse manure. Pig manure is a good substitute for cow manure, being similar in its action. At the same time it is well to note that manure from well fed dairy cows is better than that from cattle getting less rich food. If fresh it should be thrown up loosely in a heap to ferment for a week and turned at least twice during that time. Cow manure contains nitrogen, phosphoric acid, and potash. Mechanically it helps the soil to retain moisture in summer, and this is of great importance to roses. Bone manure, if good, supplies phosphoric acid and a small percentage of nitrogen. One-inch bones may be applied to the soil at planting time, but these are very slow and lasting. For more immediate use top-dress with bone meal. Superphosphate of lime may be applied in spring after pruning and lightly pointed into the ground. You may use it at the rate of two to three pounds per rod. It is quicker in its action than bone meal. The above artificial manures supply phosphoric acid, and basic slag is another of the same type. It may be applied in autumn. Potash may most profitably be applied to light soil. Some of this will be contained in farmyard manure, also in urine from cow houses and from manure heaps. Wood ashes also supply it, and this may be given in spring. Nitrogen is also a valuable manure and serves to encourage the growth of wood and foliage. It may be applied at the rate of $\frac{1}{2}$ oz. to the gallon of water at intervals of three weeks from the time the roses commence growing until the buds commence to open. Soot water supplies a little nitrogen in the form of ammonia and gives good colour to the foliage. Potash is valuable in the manufacture of starch in the foliage. Lime may be applied with advantage in heavy soils, but not at frequent intervals. Lime rubble would be less active and would answer the purpose. Marl is a slow-acting form of lime. For the purpose of food a sufficient amount of lime will usually be found in superphosphate and the various forms of bone manure. Most soils contain all of the elements of plant food in sufficient quantity, with the exception of phosphorus, potash, nitrogen, and occasionally lime. If you desire to get more growth of wood and leaves then apply some of those manures which contain nitrogen.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Book Societies is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
 The Shorthorn Herd Book of Queensland;
 The Jersey Herd Book of Queensland;
 The Illawarra Herd Book of Queensland;
 The Ayrshire Herd Book of Queensland;
 The Milking Shorthorn Herd Book of Queensland;
 The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
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DAIRY BREEDS.

AYRSHIRES.

L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	40	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane	Paringa Farm, near Cairns	5	21	Do.
John Anderson	"Fairview," Southbrook	7	34	Do.

JERSEYS.

T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoor	9	21	Do.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
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DAIRY BREEDS—*continued.*JERSEYS—*continued.*

W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Jersey Herd Book of Queensland
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, <i>via</i> Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Stand- ard Jersey Herd Book

GUERNSEYS.

Queensland Agricul- tural College	Gatton	2	2	Eligible, but no Guernsey Herd Book of Aus- tralia
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HOLSTEINS.

Queensland Agricul- tural College	Gatton	2	9	Holstein-Friisian Herd Book of Australia
George Newman ..	"St. Athan," Wy- reema	12	47	Do.
F. G. C. Gratton ..	"Fowlerton," Kings- thorpe	1	15	Do.
R. S. Alexander ..	Glenlomond Farm, Coolumboola	1	3	Do.
Ditto	Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings ..	St. Gwithian, Too- gooloowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff ..	Inavale Stud Farm, Bunjgurgun, Q.	3	9	Do.
E. Swayne	West Plane Creek, Mackay	1	2	Do.

ILLAWARRA.

A. Pickels	Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	Corndale, Coolabunia	3	43	Do.
W. T. Savage	Ramsay	2	22	Do.
Hunt Bros.	Springdale, Maleny..	3	62	Do.

MILKING SHORTHORNS.

P. Young	Talgai West, Ellin- thorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	Torran's Vale, Lane- field	1	9	Do.
W. Middleton ..	Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten ..	"Dunure," Miles ..	2	8	Do.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
BEEF BREEDS.				
SHORTHORNS.				
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall ..	Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan ..	"Arubial," Condamine	3	6	Do.
W. B. Slade ..	E. Glengallan, Warwick	2	20	Do.
HEREFORD.				
A. J. McConnell ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Do.
Tindal and Son ..	Gunyan, Inglewood	50	400	Do.
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book of England

In future, the list of Breeders of Pure-bred Stock, hitherto published in the monthly issues of the Journal, will appear half-yearly only—namely, in June and December.

FARMERS' WOOL CLIP.**PREPARATION OF WOOL CLIPS FOR MARKET—No. 2.**

By R. WILSON, Assistant Instructor in Sheep and Wool.

(Continued from November issue.)

The reason for branding the bales in this way is that the packs may be used again, and if disfigured by a large brand on the side they have to be returned to owner as second-hand, when new packs would be charged for.

The advantages to the farmer are many:—

- (a) Minimum rate of commission, $1\frac{1}{2}$ per cent., which would not be obtained unless in lots whose value is £500 and over.
- (b) Classification charges are at the rate of 10s. per bale (average weight), being apportioned according to the size of parcels.
- (c) Handling and other charges are reduced to a minimum.

The clips that are now handled by the Department would previously be sold in unattractive parcels of bales, butts, and bags that were, before the appraisement system, wholly bought by dealers and others, who reclassified and resold at a profit. I have a fair idea of that business as I was, at one time, employed as foreman to one of those firms. The farmer lost that profit. Hereunder is shown a typical submission sheet of six farmers' clips, showing the different classes and how the farmers receive their full values in the various grades.

The Department wishes to give the farmer every assistance in obtaining the best value for the product grown by him by putting the wool on the market in attractive and even lines, thereby encouraging the small owner and mixed farmer in sheep breeding, which has become a very profitable business.

PREPARATION OF WOOL CLIP FOR MARKET.—No. 3.

MERINO CLASSING—STATION AND FARMERS.

The system to follow in classing Merino wool is to class mainly to—(a) Length and soundness; (b) yield; (c) general characteristics, viz., colour, style, vegetable, earth or other foreign matter contained therein.

In the majority of cases, five to seven sorts will be found sufficient for a station of about 40,000 and upwards, and the sorts should be as follows:—First combing, second combing, first clothing, second clothing, AA fleece, A fleece, east sort.

First Combing should contain the sound, light-conditioned wool of good length, full, bold, staple, and attractive looking wool of good colour.

Second Combing includes the sound, generous-conditioned, lean-stapled, duller fleeces of good length contained in the clip.

First Clothing contains the fine, soft, light-conditioned short wool of the clip.

Second Clothing, the rougher, heavier, duller, and less attractive-looking short wool.

In regard to the grading of clothing wools, fineness to a certain extent must come in.

Fineness plays a more important part than in the combing sorts, and in regard to this type of wool, a wool may be very thin-stapled, and yet show exceptional quality and fineness, which would constitute an ideal clothing wool; because quality, and fineness are two of the most strongly marked indications of a good felting wool.

AA Fleece would contain fleeces presenting similar features to the first combing, with the exception that it would be unsound; that is, having a tendency to break when tension is applied to a staple drawn from the fleece.

A Fleece to contain fleeces similar to the second combing, but unsound.

East Sort would comprise any rough, coarse, matted, very heavy-conditioned, dingy, or any badly bred fleeces.

If there were sufficient wool that carried a great amount of condition, another sort could then be made for wool-carrying condition only, as that class of wool would be too good to mix with a matted or dingy fleece. The difference between the two wools being that the heavy-conditioned wool will wash up a good, bright colour, while the dingy wool will never wash up bright in colour. Generally speaking, it is not necessary to make a condition sort for there is often not a sufficient quantity of that particular line in a clip.

Rams' wool should be packed by itself.

Black wool should be packed by itself.

FARMERS' LOTS.

In the classing of small clips, or farmers' lots, it is not necessary to go into very scientific classing, as the main idea for every small man to consider is to class his clip into even lines, and, at the same time, make as few sorts as possible.

Supposing he has 1,000 sheep, mostly Merino, the best method would be to make two (or, in isolated cases, three) sorts at most.

They would comprise the following:—

AAA—All long, sound, medium to light conditioned wool.

AA—Short, thin-stapled, fine wool of fair condition.

A—Heavy-conditioned wool of dull colour.

There would be very little of the latter quality, as the bulk of the clip would go into the two first lines.

In a clip you generally have a few badly-bred, matted, or very heavy-conditioned fleeces that will not match your bulk lines.

Rather than put low quality wool in your good, even lines, thereby making them irregular and lowering the value, it would pay to put it into a lower grade than it really is, such as pieces, &c., where it may help that line up instead of bringing the good lines down in quality.

In packing the wool for market, good, honest packing always pays. Thoroughly trained experts are employed to value wool, and they can detect "topping up" at once, when the farmer suffers, as he is allowed such a price that the buyer would not lose, should the bale turn out to be worse than it appears when valued. Cross-bred wool should always be packed separate from Merino, and if packing unskirted, it is always advisable to remove any stained wool, rough points, or fatty edges.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1918.

Very hot days, dust storms, and hot winds have been prevalent during the month. The scarcity of green feed is badly felt by the birds, and this, together with the removal of some of the pens, has caused a considerable drop in the number of eggs obtained. The heavy breeds that have been transferred have not taken to their new quarters at all well. The laying in these pens has not stopped altogether, but is very uneven. The opposite is the case with the light breeds removed. E. Chester's pen was moved at the commencement of September, attained the highest score for that month, and has repeated the performance during October. The following pens were moved last month:—Mrs. Hunter's Messrs. Becker, E. Chester, Taylor, Marson, Quinn's Post Poultry Farm, and Mrs. Coomber's. At the commencement of this month (October) the following were transferred:—Messrs. Macrae, W. Smith, Claussen, Lyell and Dr. Jennings. On the 20th October, Messrs. Burns, Morris, Fulton, and the Nobby Poultry Farm pens were removed. The following cases of broodiness were recorded in the heavy section:—Macrae (1), W. Smith (1), Reilly (5), Dennis (1), Mars Poultry Farm (1), Walters (5), Morris (2), Burns (1), Fulton (1), Larsen (2), Fitzpatrick (1), Hindley (1), Puff (3), Mee (4), Shanks (1), Lutze (2). In light breeds—Prince (2), Knoblauch (1), Howard (1), Porter (1), Zahl (1). The following have lost birds by death:—Puff, Trapp, and Fraser. Several birds have required treatment for sickness, mostly blood troubles and bowel cases.

TRUENESS TO TYPE.

The College True to Type prizes are given for the purpose of stimulating interest among breeders in maintaining a closer approximation to the standard type in the various breeds. On this account the pens of the various competitors have been judged fairly rigidly, with the results shown below. The standard adopted for entry into the general competition is not sufficiently rigid to render all birds entered eligible for the true to type prizes. The classification of the competing pens is as follows:—Class I. have passed, having answered all requirements in regard to truthness to type. Class II. have passed, but have faults which need rectifying in future breeding. These faults will be found in the full detailed report on the subject, to be published in November issue of the Queensland Agricultural Journal. Class III. possesses faults which will, in most cases, pass them out in the next competition (1919-20), and the breeders must take drastic measures to improve, otherwise such birds will not be accepted in future competitions. The current competition will admit the class. Class IV. altogether fail to comply with our requirements, and are consequently passed out.

The following are the individual records, with classification:—

Competitors.	Class.	Breed.	Oct.	Total.
LIGHT BREEDS.				
*Dixie Egg Plant	II.	White Leghorns	140	1,005
*E. Chester	III.	Do.	145	931
*G. W. Hindes	I.	Do.	144	914
*Geo. Howard	I.	Do.	125	885
*C. P. Buchanan	II.	Do.	131	870
*Geo. Prince	III.	Do.	130	867
G. H. Turner	III.	Do.	137	858
*T. Fanning	I.	Do.	133	855
*C. Knoblauch	III.	Do.	112	852
*W. Becker	III.	Do.	141	852
Mrs. L. Henderson	I.	Do.	136	841
*W. Lyell	II.	Do.	125	826
*E. A. Smith	II.	Do.	136	816
*Oakland Poultry Farm	III.	Do.	133	814
*R. Holmes	II.	Do.	115	813
*L. G. Innes	II.	Do.	129	809
*O.K. Poultry Yards	IV.	Do.	117	781
B. Caswell	I.	Do.	122	775
*Quinn's Post Poultry Farm	II.	Do.	135	774
*Dr. E. C. Jennings	IV.	Do.	126	766
*Range Poultry Farm	II.	Do.	126	747
J. J. Davies	I.	Do.	119	739
*Mrs. A. T. Coomber	II.	Do.	130	723
*Thos. Taylor	II.	Do.	112	722
*Chris. Porter	III.	Do.	94	708
Harold Fraser	III.	Do.	106	707
*Homalayan Poultry Farm	II.	White Leghorns	135	699
*J. M. Manson	II.	Do.	119	698
*J. Zahl	IV.	Do.	115	687
O. W. J. Whitman	III.	Do.	84	674
Mrs. L. F. Anderson	II.	Do.	127	661
*T. B. Hawkins	II.	Do.	110	643
*Mrs. R. Hunter	II.	Do.	133	640
R. T. G. Carey	IV.	Do.	88	640
*J. W. Newton	II.	Do.	128	636
Mrs. A. G. Kurth	II.	Do.	131	635
S. Wilkinson	IV.	Do.	115	624
H. B. Stephens	II.	Do.	124	614
G. Williams	II.	Do.	96	603
Shaw and Stevenson	I.	Black Leghorns	117	602
Geo. Trapp	I.	White Leghorns	104	592
H. F. Britten	I.	Do.	116	591
Progressive Poultry Pens	I.	Do.	121	579
B. Chester	II.	Do.	116	555
P. O. Oldham	I.	Do.	119	553
W. A. Wilson	II.	Do.	115	522
A. W. Walker	I.	Do.	123	517
HEAVY BREEDS.				
*Nobby Poultry Farm	II.	Black Orpingtons	105	902
*E. F. Dennis	IV.	Do.	126	809
*A. E. Walters	I.	Do.	110	801
*E. Morris	III.	Do.	105	786
T. Hindley	II.	Do.	113	778
*D. Fulton	II.	Do.	133	769
*Mars Poultry Farm	II.	Do.	131	757
*R. Burns	III.	Do.	120	756
*W. H. Reilly	II.	Chinese Langshans	110	707
*W. Smith	I.	Black Orpingtons	68	688
A. Shanks	I.	Do.	118	675

EGG-LAYING COMPETITION—*continued.*

Competitors.	Class.	Breed.	Oct.	Total.
HEAVY BREEDS— <i>continued.</i>				
E. M. Larsen	II.	Black Orpingtons ...	94	673
*J. W. Macrae	II.	Do.	55	659
T. W. Lutze	II.	Do.	116	610
W. J. Mee	IV.	Do.	68	548
*F. A. Claussen	I.	Rhode Island Reds ...	71	541
H. Puff	I.	Do.	92	487
Jas. Fitzpatrick	I.	Do.	93	462
Totals			7,563	46,613

* Indicates that the pen is engaged in the single hen test.

RESULTS OF SINGLE HEN TESTS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
Dixie Egg Plant	157	162	180	155	170	181	1,005
E. Chester	158	157	146	176	147	147	931
G. W. Hindes	185	153	142	154	146	134	914
Geo. Howard	139	148	146	153	147	152	885
C. P. Buchanan	133	145	148	148	155	141	870
Geo. Prince	124	160	146	151	138	148	867
G. H. Turner	91	123	157	156	181	149	858
T. Fanning	153	133	158	108	154	149	855
C. Knoblauch	144	132	158	136	135	147	852
W. Becker	144	146	123	157	129	153	852
Mrs. L. Henderson	149	126	141	109	158	158	841
W. Lyell	142	148	147	132	127	130	826
E. A. Smith	114	157	140	149	141	115	816
Oakland Poultry Farm	123	133	150	151	132	125	814
R. Holmes	148	150	129	132	118	136	813
L. G. Innes	144	159	172	89	99	146	809
O.K. Poultry Yards	124	141	145	115	139	117	781
Dr. E. C. Jennings	116	157	139	118	132	104	766
Quinn's Post Poultry Farm	162	112	122	110	155	113	774
Range Poultry Farm	47	161	107	138	142	152	747
C. Porter	92	122	136	117	109	132	708
Thos. Taylor	93	136	125	110	126	132	722
Mrs. A. T. Coomber	110	136	119	126	92	140	723
J. Zuhl	146	113	136	130	98	64	687
J. M. Manson	148	132	148	87	75	98	688
Homalayan Poultry Farm	144	122	103	95	132	103	699
T. B. Hawkins	131	103	134	90	90	95	643
J. W. Newton	119	150	66	92	116	93	636
Mrs. R. Hunter	102	138	52	103	121	124	640
HEAVY BREEDS.							
Nobby Poultry Farm	171	151	136	113	160	171	902
A. E. Walters	118	160	98	157	160	108	801
E. F. Dennis	161	127	125	77	175	144	809
E. Morris	116	124	149	156	138	103	786
R. Burns	118	132	105	115	158	128	756
D. Fulton	148	122	122	119	80	178	769
Mars Poultry Farm	135	144	118	130	115	115	757
W. Smith	166	121	54	122	101	124	688
J. W. Macrae	75	33	134	100	127	140	659
W. H. Reilly	123	143	122	74	111	134	707
F. A. Claussen	99	96	82	101	105	58	541

GENERAL COMMENTS ON "TRUENESS TO TYPE," COMPETITION BIRDS.

Light Breeds.—The improvement in type of the birds competing in the current competition is small in comparison with the 1917-18 contest. In classifying the pens, the standard of the utility poultry breeders has not been strictly adhered to, and a good deal of leniency has been shown in connection with the English Poultry Club standards. There are a few pens of exceptional quality, and it is very gratifying to be able to say that these same pens have, in nearly every instance, given a satisfactory account of themselves. The type of the birds in the six-hen test, which are for the most part owned by beginners in competition work, is much better than the type of those owned by the majority of the old hands, and new men in the singles have in most cases forwarded good specimens. In our opinion, the pen owned by G. W. Hindes is almost ideal for utility work, and possesses every feature that marks them as Leghorns. They have size without coarseness, are very uniform, with typical Leghorn bodies, and perfect headpieces. They also possess stamina which no change in weather or conditions seems to shake. This, in our opinion, is half the battle in competition work. This same pen has passed the weight of egg test, and takes the third place for number of eggs produced. It is, therefore, plainly proved that close conformity to the English standard weight and number of eggs can be obtained by some breeders. It is therefore intended to adopt more stringent measures each year, allowing ample time for competitors to make the necessary improvements in their stock. The lack of uniformity in some of the pens spoils their whole appearance. Several pens are completely spoilt, and consequently graded lower, owing to one or two individuals being dwarfed. The Homalayan P. Farm's F bird in the single test is about the most typical bird in the competition, yet the pen is graded second class owing to the absence of uniformity. There are a goodly number of Leghorns with very diminutive combs. Taken for granted that the comb calls for a certain amount of upkeep, the larger it is the bigger the drain on the bird's system, a Leghorn without the neatly serrated, fine-textured comb hanging gracefully on one side has the appearance of anything other than a Leghorn, especially if the medium comb is in conjunction with small size or discoloured lobes. Tail-carriage in Leghorns has a tendency to alter the general outline of a bird. One possessing a "squirrel" tail usually carries its body more erect than one with the tail at an angle of 45 degrees to the back. These high-tailed, upright carriage birds always appear to be short backed, and always have an erect or semi-erect comb and rather long shanks. During the six months' duration of the present competition the weather has been most variable, and at times only birds possessing stamina could show a satisfactory advance in their totals. Owing to the judgment for trueness to type having been postponed till half the contest was finished, we are placed in a favourable position to observe the doings of the pens during trying weather conditions. There are, in our opinion, certain pens which their owners have had difficulties in rearing, and others that show every evidence of having been troubled with roup, catarrh, and other sickness in their early life. It is very often the case that a breeder has trouble with his young chickens, and at times has to treat them for various ailments; but as soon as these same birds reddened up for laying and have that beautiful appearance that a pullet has when about to lay, in a large number of cases the owner forgets the bird's past life, thinks only of how she appears at the time for sending for competition work, and the way she was bred. These birds which have had early set-backs are soon picked out when the genuine hard work comes or the weather is trying. Some continue to lay moderately, but their drawn-in faces, anaemic combs, shrunken legs, overloaded tail appearance, poor appetites, and forlorn look give them away when the subject of stamina comes in. Stamina has had a great deal to do with the manner in which the birds are graded, for without it they cannot stand a year's heavy laying, and then be expected to produce birds even better than themselves. Competitors who think they have been hardly dealt with in the classification can rest assured that one of the reasons for their being graded lower than their expectations is that the birds owned by them are showing the strain in too marked a degree. Owing to the scarcity of green feed, closely bred birds feel its absence and show it in their returns. The

very hot weather, together with the absence of greenstuff, picks out and hastens the death of a number of birds possessing hereditary weaknesses and disease. It would be far better for a breeder to sacrifice a dozen or two eggs than to put up with the trouble and disappointment of rearing the present day usual run of weak constitutioned specimens. The heavy mortality in rearing is often the cause of the disheartening of a beginner.

Heavy Breeds.—We have gone to the expense of leniency in classifying the heavy breeds, which for the most part consist of Black Orpingtons. Not only have breeders to make a big improvement in type, but the size of the eggs and tendency to broodiness have to be amended. There is a very great variety of type amongst the Orpingtons. There are birds with short backs, roach backs, funny backs, and those with cushions resembling those of a present-day Cochin. These backs finish off with an assorted variety of tails. There are true Orpington tails, long tails, and spread tails. Breeders of exhibition Orpingtons know too well the difficulty of producing blacks with that much desired green sheen, so too strict attention has not been given to this feature when passing verdict in this section. The required points of an Orpington are much harder to obtain than those of a Leghorn; hence, as previously remarked, more leniency has been shown in classifying in this breed. Side spikes on single combs are in evidence in too many cases for one's liking: it is a defect which is transmitted. Birds having this fault will be placed in the 4th class in future competitions, and the same may be said of birds having feathers on their shanks in the clean-legged breeds. The combs on some of the Black Orpingtons are too large and hang to one side, so that if they possessed white lobes they would easily pass for a light breed. The build of some, with their long backs, tails, and legs, together with their fineness of bone, more resembles a light breed than a heavy one. The sooner the better it will be for all utility poultrymen when a thorough understanding is arrived at as to what constitutes the type, and the number of points to be allotted for each feature in all breeds for utility purposes, instead of one common standard as issued by the Utility Poultry Club. The severe task of classifying 400 birds, the majority of which possess any number from three to a dozen failings on comparing them with the original standard, is a task not to be envied. Often the remark is heard—"That's So-and-so's type of birds." It may mean that So-and-so's stock compare with the standard so favourably that they stand out from all others; or, on the other hand, that he has been adopting close breeding and has stamped a number of failings into his flock which are easily detected. Shape is half the breed, and features the other half. The writer of these notes once showed a Jubilee Orpington, rather long in back, as a Speckled Sussex in one of the leading young stock shows of England, and won first prize. The same bird won first and cup at the Crystal Palace in the Jubilee Orpington class, thus showing that too much was allowed for colour and not sufficient for shape. The evolution of the Orpington has been remarkable. The late Wm. Cook originated the breed, for one reason, for lovers of the Cochin who objected to the feathering on the legs; but it must be borne in mind that the Cochin of that date was not the mass of balls of fluff it is at the present day. The first Black Orpington that was shown was very clean in face, possessed good eyes, but was not the full-fronted bird of the present day. It possessed width, fair length of back, a moderate tail, and showed more daylight underneath than the show bird of to-day, which has the appearance of being related to the old Scotch Dumpie. In fact, the old time B.O. had the appearance of a robust, rather close feathered, better class utility Black of the present time.

The classification of the competing pens is as follows:—

Class I.—Have passed, having answered all requirements in trueness to type.

Class II.—Have passed, but have faults which need rectifying in future breeding. These faults will be found in the full detailed report given below.

Class III.—Possess faults which will pass them out in the next competition (1919-20), and the breeders must take drastic measures to improve same, otherwise they will not be accepted for future competition. This current competition will admit this class.

Class IV.—Altogether failing to comply with our requirements and consequently passed out.

Detailed Comments on Light Section.

- G. W. Hindes (Class I.).—Nearest our ideal in the competition.
- O.K.P. Farm (Class IV.).—B, D, and E too small. F side spikes.
- Range P. Farm (Class II.).—Strong constitutions, variation in tail carriage.
- I. G. Innes (Class II.).—Devoid of Leghorn headpieces, only just managed to get into this class.
- Geo. Prince (Class III.).—B inclined to be wry-tailed.
- C. Knoblauch (Class III.).—Lacking in stamina.
- Oakland P. Farm (Class III.).—Tail carriage variable, assorted sizes and headpieces.
- E. A. Smith (Class II.).—Lack uniformity, strong constitutions.
- Geo. Howard (Class I.).—F a trifle small, good constitutions, D one of the most typical in competition.
- T. Fanning (Class I.).—Robust, good doers, possessing size, and Leghorn characteristics. F a really fine specimen.
- W. Lyell (Class II.).—An even, business-like pen, but could do with more size.
- Dr. E. C. Jennings (Class IV.).—D and F very small, spoiling pen altogether, too high tail carriage and tails too erect, A, B, and C good bodies.
- R. Holmes (Class II.).—Rather narrow, could do with more room behind in some cases, splendid open faces and fine textured combs.
- T. B. Hawkins (Class II.).—C bird appears on the weak side.
- G. H. Turner (Class III.).—C and E too small, E white in face, pen lacks uniformity.
- Mrs. L. Henderson (Class I.).—Good bodies and tail carriage, neat heads.
- Homalayan P. Farm (Class II.).—Very variable, B inclined to be weak, F bird an ideal specimen.
- C. Porter (Class III.).—Splendid bodies, but all white in face.
- C. P. Buchanan (Class II.).—Rather on fine side, but strong, good doers.
- J. W. Newton (Class II.).—Largest in competition, too coarse in cases; headpieces away from requirements, being too large in some and rough textured in others.
- Dixie Egg Plant (Class II.).—Not of the largest, D and E possess neat heads, the others having very small combs, rather fine in type, faults largely counteracted by stamina.
- J. Zahl (Class IV.).—Lacking in stamina.
- Mrs. R. Hunter (Class II.).—Heads trifle coarse; good size, shape, and bone; A and E have side spikes on comb.
- W. Becker (Class III.).—Squirrel-tailed, C wry-tailed, combs too erect, only just managed this class.
- E. Chester (Class III.).—Side spikes in evidence, lack size and substance, splendid constitutions.
- Quinn's Post P. Farm (Class II.).—B bird too fine in bone, good bodies; F erect comb.
- Mrs. A. T. Coomber (Class II.).—Size varies, C spoils pen, F very typical.
- Thos. Taylor (Class II.).—B bird too fine, otherwise first-class pen.
- J. M. Manson (Class II.).—Could be more uniform.
- H. F. Britten (Class I.).—A very nice light-feathered pen, showing no weediness whatever.
- G. Williams (Class II.).—On the narrow side and not too uniform.

A. W. Walker (Class I.).—A pen we like very much, being very typical and good doers, evidently were used to intensive housing before arrival at competition.

H. Fraser (Class III.).—Very mixed.

W. A. Wilson (Class II.).—One small bird spoils pen.

S. Wilkinson (Class IV.).—Too small and type very variable.

Mrs. L. F. Anderson (Class II.).—Lack uniformity.

B. Chester (Class II.).—Spoilt by variation in size.

Geo. Trapp (Class I.).—Splendid bodies and carriage.

R. T. G. Carey (Class IV.).—Type and size very uneven.

O. W. J. Whitman (Class III.).—Lacking in stamina.

B. Caswell (Class I.).—Very even and good stamina, want just a little more size.

P. Oldham (Class I.).—Nice headpieces, slight variation in size, good bodies.

J. J. Davies (Class I.).—Good doers, a pleasing pen all through.

Shaw and Stevenson (Class I.).—A first-class pen for type, size, and colour. Constitutions good.

Mrs. A. G. Kurth (Class II.).—Rather coarse in heads, good bodies and stamina.

Progressive P. Pens (Class I.).—A front rank pen for size and shape. Another pen that has evidently been used to intensive work before entering competition.

Heavy Breeds.

J. W. Macrae (Class II.).—Good size, plenty of room, too much tail.

W. Smith (Class I.).—Nice and blocky, type of the best if compared with average utility Blacks of the present day.

F. A. Claussen (Class I.).—Good size and shape, colour passable on arrival in April, 1918.

D. Fulton (Class II.).—Type not consistent throughout, splendid eyes.

Nobby P. Farm (Class II.).—Very strong constitutions, roach backs and too tall on legs.

R. Burns (Class III.).—A big variation throughout in type and size.

E. Morris (Class III.).—Type not regular enough, those possessing shape are too small.

A. E. Walters (Class I.).—A very nice pen, taken all round, not so tall as the majority, headpieces very neat.

Mars P. Farm (Class II.).—Very neat heads, inclined to too much tail.

E. F. Dennis (Class IV.).—Type very variable, poor colour.

W. H. Reilly (Class II.).—Type and size not consistent, type of D bird approaching that of a modern Langshan.

E. M. Larsen (Class II.).—Good constitutions, and not so tall as a good many; could be more uniform.

J. Fitzpatrick (Class I.).—Good size and stamina, not the best of colour.

T. Hindley (Class II.).—First-class headpieces, too much tail, colour in some cases dull and devoid of sheen.

H. Puff (Class I.).—The pick of the R. I. Red pens; two birds in this pen are fit for show bench.

W. J. Mee (Class IV.).—Too small, and altogether away from standard.

A. Shanks (Class I.).—One of the best pens in the heavy section for colour and Orpington characteristics.

T. W. Lutze (Class II.).—Strong big-framed birds on the big side.

CUTHBERT POTTS, Principal.

The Orchard.

A FEW NOTES ON CITRUS CULTURE.

Read at the Fruit Growers' Conference held at Palmwoods, 2nd November, 1918.

By ALBERT H. BENSON, Director of Fruit Culture.

At your last conference, which was held in October, 1917, a long, interesting, and instructive paper on Citrus Culture was read by the late Mr. S. C. Voller, and was evidently much appreciated, as your secretary has asked me to prepare a paper on the same subject for submission to you to-day.

As I have already dealt very fully with this matter in my writings, I do not consider it necessary to go into details now, but will confine my remarks to those points that are of especial interest to growers at the present time. Should any grower require fuller information than that contained in these notes, I would refer him to the last edition of my work on Citrus Culture, issued in 1916, and which can be obtained on application from the Department of Agriculture and Stock.

There are, however, certain well-established facts connected with the industry on which the success or failure of the orchard is very largely dependent, and although these facts are well known to the majority of growers, they will bear repeating as they are of the greatest importance to beginners.

In the first place, the selection of suitable soil and a suitable situation for the citrus orchard is imperative, as without these essential factors the commercial success of the undertaking is very doubtful under existing conditions. Intending growers cannot afford to make any mistakes at the start, but must be certain that the land they select is suitable in every way, which means that, not only must it possess perfect natural drainage, but it must be capable of being worked economically.

This narrows the choice of sites, as the only soils that will fulfil these conditions are deep, free loams or sandy loams that will not retain stagnant water even during periods of heavy and prolonged rainfall, and the choice of such soils is further limited when the cost of working is taken into consideration.

Level or nearly level land is much cheaper to work than hillside land, as practically the whole of the cultivation that is so necessary to keep down weed growth, and to conserve water in the soil during a dry time, can be carried out by horse labour and the use of up-to-date implements of cultivation.

Level land possessing a suitable soil does not wash during periods of heavy rainfall, and thus there is no danger in keeping it in a state of perfect tilth; further, the cost of spraying or cyaniding and the gathering and handling of the fruit is materially reduced, and manures are not washed out.

Other conditions being favourable, it will thus be seen that the more level the land the better, as the cost of producing and handling the fruit is considerably reduced.

Having selected suitable land, the next step is its preparation. This should always be thorough, as once the trees are planted you never get as good a chance again, and, though the initial expense is greater, it always pays in the long run. The same remark applies to the selection of the trees and planting. Only well-grown, perfectly healthy trees should be planted, and they should be planted properly. This necessitates, first, a careful examination of the roots and cutting away all badly-bruised or broken roots, and secondly, the planting of the tree at the right depth and placing the roots so that they will have a downward and not an upward tendency.

To do this, the digging of large or deep holes is not necessary, as, if the land has been properly prepared, all that is required is to make the hole large enough to take the spread of the roots, and for the tree, when planted, to stand in the soil at the same depth it stood when growing in the nursery. The centre of the

hole should be a little higher than the sides, so as to give the roots a downward trend.

If dry at the time of planting, place a little fine top soil round the roots when they are placed in position, and then give the tree a good watering and fill in the hole with soil. This will give the tree a start, as the water will not dry out quickly on account of the soil mulch above the wet ground, whereas, if a surface watering is given, the effect is soon lost.

We now come to one of the most important parts, and that is the pruning of the young tree as soon as it is planted. In removing the young tree from the nursery, it has been deprived of most of its root system, especially the fine, feeding roots, so that it is necessary to reduce the top in order to give the root system a chance to recuperate, and it is also necessary to cut back so as to provide a strong framework for the future tree. This means that only a limited number of branches are left, not less than three nor more than five, as these first branches eventually become the main limbs of the tree. Many growers make the mistake of leaving far too many branches, with the result that the branches are too crowded and very weak, so that when they are laden with fruit they are unable to bear the weight and frequently break down. This is often seen in the case of mandarins, and particularly with the Beauty of Glen Retreat, which requires very careful attention when young, as it is apt to produce a dense growth of weak wood unless its main limbs are properly established and all subsequent growths are kept severely thinned. If the tree is not pruned out properly it will overbear, the result being a great crop of undersized fruit one year, that is hard to dispose of, and a sickly looking tree and very little fruit the next.

No citrus tree should be allowed to grow into a dense bush, as it is impossible to spray such properly, and consequently they become a breeding ground for all kinds of pests. A typical citrus tree should have one main trunk from 18 inches to 2 feet high, with not more than three to five main branches, and these main branches should only be allowed to carry sufficient subsidiary branches to form the framework of the tree. All others are unnecessary and should be removed.

The inside of the tree should never be crowded, the limbs should be properly spaced, and the outer branches on which the fruit is produced should not only shade the inside of the tree, but the ground under the tree, so that as long as the lower branches are clear of the ground, when in fruit, they can be left on.

High heading is not, in my opinion, desirable in this climate, as the ground requires shading from the summer heat, and, further, the more of the crop that can be gathered from the ground the better.

The great fault of beginners is that they are afraid to prune hard enough, and there is frequently much more harm done to the trees by under-pruning than by over-pruning.

Properly pruned trees produce regular crops, as they make a good growth annually, but under-pruned trees are very apt to over-bear one year and consequently to make little new growth, so that the following year they have a small crop and have to make wood for the next season's crop.

The pruning of the lemon is quite different from that of the orange or mandarin, once the tree is given its permanent shape, as, unless the long straggling growths it is prone to throw out are kept well shortened back, so as to encourage the production of fruit-producing laterals, you get a very untidy tree that bears the majority of its fruit at the ends of long branches that sway about in the wind and rub or bruise much of the fruit. In pruning the lemon the main object is to encourage lateral growths on which to grow the fruit, and to discourage the production of long straggling branches. A well-pruned lemon-tree in full bearing should not be more than ten feet high, and should have its laterals so spaced that there is no overcrowding. Such a tree will bear even crops of well-grown fruit, whereas a tree allowed to run wild will produce a lot of coarse fruit which is hard to dispose of.

So far I have only dealt with the pruning of young trees and healthy trees, but it frequently happens in old or neglected orchards that quite another class of pruning is necessary—namely, pruning for renovation. This is a very important matter, as, if it is carried out in time, many an apparently worthless tree can be brought round and made to produce profitable crops. The bearing wood of many old trees frequently becomes useless as the result of drought, neglect, starvation, want of pruning, insect or fungus pests, &c. The wood is hidebound and there is no free flow of sap. Such trees frequently show signs of gum on the main branches and they throw out many water sprouts. Trees showing these symptoms should have

their roots carefully examined, and if the roots are found to be healthy, they can be brought round by giving them proper treatment. This consists of removing the top of the trees, cutting back all limbs till sound, healthy bark and wood are met with, and removing all dead or superfluous main branches. The tree is then painted or sprayed with a strong solution of lime-sulphur, not less than one part of the standard solution of 32 deg. Beaumé in 10 of the mixture when used as a spray, or even much stronger when used as a paint. The ground round the tree should then be worked up well and a good dressing of a complete fertiliser given. This work should be done when the tree is more or less dormant, and as soon as rain comes young shoots will make their appearance all over the tree, and these should be carefully thinned out, only leaving enough to form the new top of the tree. If these young shoots make a strong growth they should be checked, so as to encourage lateral growth, and this in turn must be thinned out. If this work is carefully carried out a tree that was practically useless on account of its worn-out top will have a new head of vigorous growing wood which will produce good fruit. If the tree is then properly looked after—that is to say, kept pruned, manured, sprayed, and cultivated—it will continue to yield a profitable return for many years.

The next point to be considered is how to keep the orchard clean—that is to say, free from insect and fungus pests. The first consideration is to keep the trees in a healthy and vigorous condition by proper pruning combined with thorough cultivation and systematic manuring, as healthy vigorous trees are able to throw off many pests that a weakly, neglected tree would succumb to. The second consideration is to systematically inspect the whole of the trees in the orchard at regular intervals, so that the presence of any disease can be detected before it has become firmly established, as it can then be stamped out before it has had time to do serious damage.

The trouble is that many orchardists fail to recognise the importance of taking steps to fight diseases as soon as they make their appearance, and frequently allow their trees to become so badly infested that their vitality is seriously injured; the crop suffers in consequence, and the cost of cleansing the orchard and bringing the trees back into a healthy condition is a heavy tax on the grower. Diseases such as borers of all kinds, gumming, both of the branches and around the collar of the tree, bark-destroying fungi of several kinds, and red scale, require attention as soon as ever they make their appearance, and if they are taken in hand promptly they cause little damage, but if they are neglected the tree soon shows signs of distress.

In fighting fruit pests the old saw "A stitch in time saves nine" is very sound advice and should be kept in mind by all growers, as by acting up to it they will be saved a lot of trouble and expense.

I will not go into further details to-day, as I have just revised an edition of my pamphlet on Fruit Pests, which I have tried to bring up to date, and which is now in the hands of the Government Printer, so that, when issued, I trust it will be found useful to growers.

I will now conclude my remarks with a little general advice on marketing the fruit, as no matter how well you keep your orchards, and no matter how good fruit you grow, you will not get the best returns unless it is properly marketed.

Now, what I mean by being properly marketed is, that the fruit must be placed on the market in the best possible condition, so that when opened up for sale it will show off to the best possible advantage.

To do this the grower must spare no trouble—he must gather the fruit carefully so as to prevent bruising, he must grade it, both for size, quality, and colour, and he must only pack one grade of even size, quality, and colour in a case, so that when the case is opened up for sale the fruit will not only show to the best advantage, but the shown surface will indicate the quality of the whole of the contents, and buyers will know exactly what they are purchasing.

Fruit will have to be packed in this manner in order to comply with the Victorian regulations, and, therefore, it is advisable to pack all fruit properly, so that there will be no difficulty in their being admitted into any State.

In the case of our local Queensland markets, our regulations demand honest packing and the correct marking of the case, and growers who fail to comply with the law are being proceeded against.

The honest packer has nothing to fear, and it is only fair that he should be protected from the man who tops his fruit or puts it on the market under another man's brand.

Horticulture.

THE ROSE GARDEN.

Roses Pegged Down.—The object of bending over the long growths of roses is to induce the eyes all along the shoot to start into new growth and to produce blooms. If the long growths are not so bent, the sap flows to the extreme ends, and only those buds at the ends will move. If you observe a wild rose in the hedgerows you will usually find some long growths have arched over naturally and they are studded with shoots and blooms. It is not at all necessary to peg the ends into the soil. The best plan is to drive a few stout pegs into the ground, then attach farred twine to them by making a notch so that the string cannot come off. The end of the growth is then secured to the string and bent at any angle preferred. The ends may touch the ground or be a foot or so away; it is immaterial. We like to peg one or two growths and allow the others to grow naturally on such plants as are suitable to treat in this way. If such as W. A. Richardson are pegged, all the growths may be bent, and towards autumn a number of new shoots will spring up from the base, and after attaining a height of about 3 feet will flower at their extreme ends, and most lovely sprays they will produce. Any rose at all shy in blooming should have its growths trained horizontally or arched over. This will induce it to bloom quicker than anything, only the growths must be hard and well ripened. We cannot expect much bloom from pithy wood. We have seen standards of such shy bloomers as Reve d'Or with their growths tied out horizontally to a framework of bamboo, and in a year or two they bloomed marvellously. Some of the old growths are removed after flowering, and new growths take their place another year.—“The Garden.”

GARDEN WORK AND HEALTH.

No one who pays the least attention to the ebb and flow of public taste can fail to note the ever-rising tide of the gardening instinct. In striking contrast to many other pursuits the interest in matters horticultural flows on and on, but never does it ebb. There are few outdoor amusements of which the same remark can be made. The last thirty years have seen the wax and wane of many open-air games and occupations. Tennis and croquet, so absorbing in their day, have had their ups and downs. Cycling—useful as it is—does not hold the position in public favour which it did a few years ago. Motoring, though just now in the ascending scale, may have given place in another decade—who knows?—to airships. The young and the strong may indulge in these and many more pastimes while health and strength last; then the wear and tear of the nervous system begins to tell upon them, and they drop behind in the race for distinction, while the weakly are left out of the running altogether. Doubtless all these in moderation tend to healthfulness; when all of them fail in their turn then gardening comes in and fills the gap, and happy is he or she who has a good foundation of experience to begin upon.

The reason why gardening will always hold its own is not far to seek. Nature—the mother of gardens—holds in her beautiful hands the inexhaustible gift of life, and horticulture is one of her chosen handmaidens to distribute the blessings which she is able and willing to bestow upon all who will work for them.

In many branches of natural history destruction is bound to precede exact knowledge. The entomologist pins his beetles to the board. The ornithologist shoots his bird to make sure of its species. The gardener, on the contrary, cherishes the germ; his aim is not destruction, but growth and progress in the pursuit of practical knowledge, and the result of his work is living beauty. And while he toils to wrest her secrets from nature, she rewards him, all unwitting, with the health of mind and body which comes of congenial occupation in the open air. It is true, in a measure, that the gardener must be born, not made, and that, just as we have met with isolated cases in which the song of birds gives pain rather than pleasure, so here and there we find those so closely wedded to the life of towns that a garden to them would be as a waste howling wilderness. But even such as these depend upon the products of the soil so long as they come to them without pains or trouble. The health and enjoyment, however, that follow on genuine work in a garden never come to such as these.

We may be sure that no pursuit will give quicker or better returns in health and wellbeing for thought and work and money expended than horticulture in any of its varied aspects. For in a well-ordered garden work goes hand in hand with good play, and many another bright and pleasant thing, and we feel that there is no exaggeration in calling it, after John Parkinson's old-world phrase, “In very deed an earthly paradise.”

Botany.

TWO NATIVE LEGUMINOUS FODDER PLANTS.

By C. T. WHITE, Government Botanist.

PSORALEA CINEREA.

Mr. A. J. Cotton, in a letter from Brunette Downs, Northern Territory, some little time back wrote: "I am forwarding a sample of herb which grows most plentifully here on our lake country, and on which the cattle do remarkably well, it being the only fodder they get to eat on that part of the country, which will always produce fat cattle when the herd on the rest of the country are half poor. It seems to have some wonderful fattening properties. It is not known in the other parts of the territory (by other parts, I mean the country that is not flooded). Looking at it as it grows in the wild state, it has the appearance of lucerne, and is called hereabouts "urvine" or "herb-vine."

Psoralea cinerea is a very common plant in some parts of Western Queensland and is also found in north-western New South Wales.

The genus *Psoralea* is a large one, comprising about 100 species found in different parts of the world; sixteen species occur in Australia, and of these eleven are found in Queensland.

They are strong growing lucerne-like plants in appearance and hence are often known as "wild lucerne," a sobriquet applied, however, to a great number of wild leguminous plants. The older stems are very tough and fibrous, and two species are recorded as having been used for fibre-making by the aborigines.

Psoralea tenax is a very common species in Southern Queensland and is looked upon as a useful fodder herb. Of species found outside of Australia, J. G. Smith, in Bulletin No. 2 of the Division of Agrostology, United States Department of Agriculture, records the genus as containing several excellent fodder plants. According to Ewart and Davies, in the "Flora of the Northern Territory," some species outside of Australia are considered poisonous to stock, and it may here be recorded that specimens of the species under notice have been received from the Flinders River country, where it is very common, as suspected of poisoning cattle. It is not likely, however, that any of the Australian species are poisonous to stock.

ALYSICARPUS RUGOSUS.

In forwarding specimens of this plant for identification from Corfield, Mr. F. M. Boyd writes: "The plant sent is new to this part of the country, stock devour it in preference to any other kind of grasses or herbage, and it is very abundant this year (March, 1918); horses that get plenty of it are like cornfed animals."

Alysicarpus is a small genus of plants scattered over the world. Two species—*Alysicarpus vaginalis* and *Alysicarpus rugosus*—occur in Queensland, both are found beyond Australia; the former is mostly a coastal plant and the other a more inland one.

The accompanying plate should aid people interested in recognising the two plants referred to in this article, should they come across them at any time, or should they have them growing on their properties, and the interest being taken in native fodder plants warrants the publication of the foregoing notes.

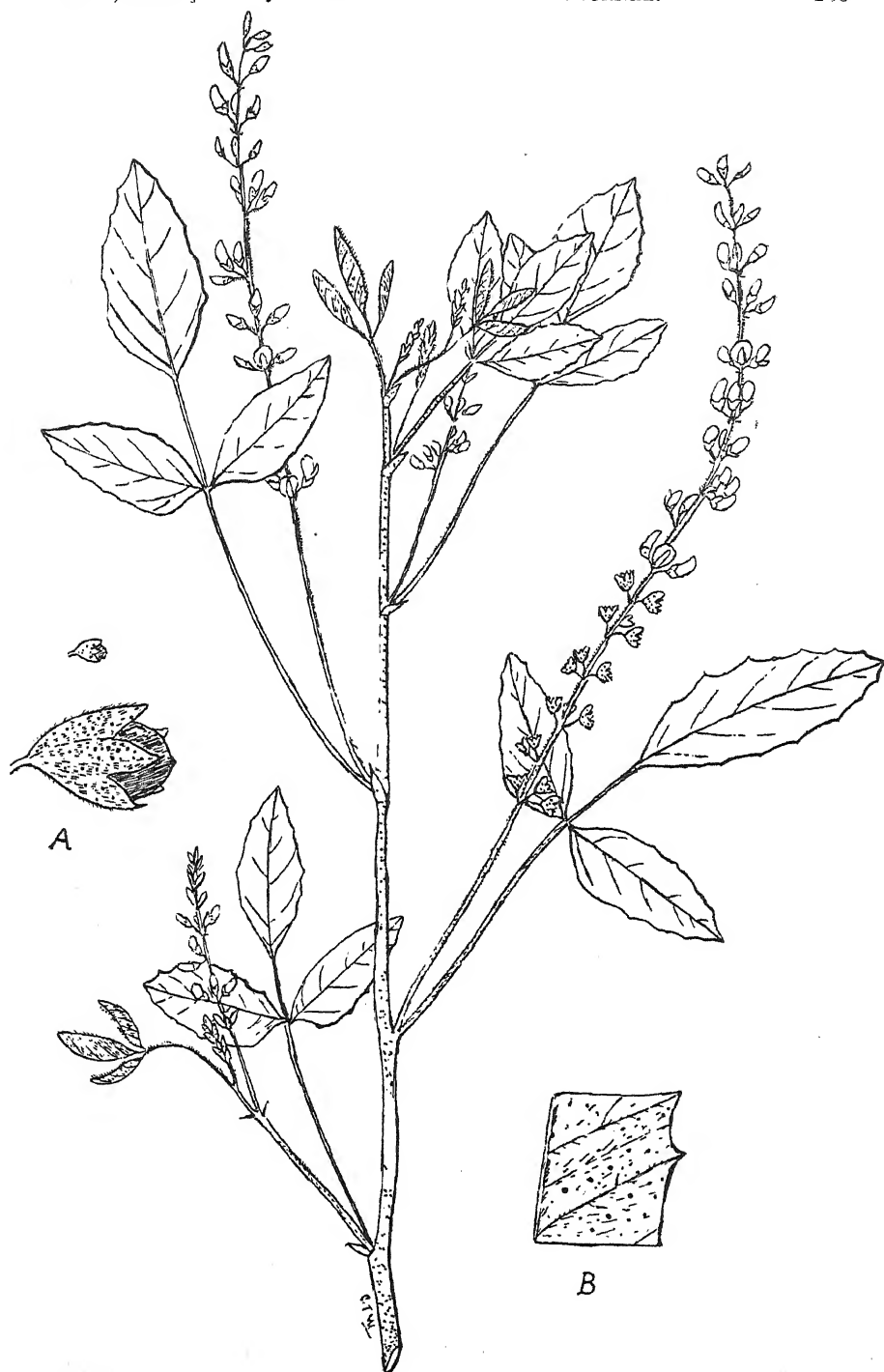


PLATE 31.—*PSORALEA CINEREA*. WILD LUCERNE, HERB-VINE OR URVINE.
(shoot natural size.)

A—Seed pod enclosed in the calyx, natural size and enlarged.
B—Portion of leaf surface, enlarged to show scattered hairs and black glands.



PLATE 32.—ALYSICARPUS RUGOSUS.

A—Pod with four articles; each, except the lowest one, contains one seed, and are easily broken off one from another. B—Seeds (all natural size).

HOW TO ESTIMATE THE YIELD OF COTTON LINT PER ACRE.

The yield of lint is estimated from the number of bolls on the plant thus:—Count the bolls on a number of plants of moderate size, and take the average number per plant. For every 15 bolls where the plants are in rows 5 feet apart, and 20 inches apart in the rows, the yield is usually about 100 lb. of lint (ginned cotton) per acre. Of course, this will vary slightly with the variety of cotton, and with the yield of lint per 100 lb. of seed cotton. On the average, 300 lb. of lint are obtained from 1,100 lb. of seed cotton. Sometimes, however, where the variety has large seeds, or where the seed cotton has been kept for an unusually long time, as much as 1,500 lb. is required to yield 300 lb. of lint. This refers to Sea Island cotton. In several cases in Queensland where Uplands cotton has been planted at distances of 4 feet by 18 inches (7,260 plants per acre), the average number of bolls per plant has been 300. By the above rule these plants should yield 300 lb. of clean cotton per acre. A crop of 1,000 lb. of seed cotton will yield about 300 to 400 lb. of lint, the balance being seed. An average crop of 1,000 lb. of seed cotton per acre, at 3d. per lb., would amount in value to £12 10s. per acre. On suitable land, crops of 1,500 to 2,000 lb. of seed cotton in Southern Queensland, which, at 4d. per lb., is equal to a return of from £25 to over £33 per acre.

THE PROFITABLE PEANUT.

Not long ago the “monkey” or peanut was considered a trifle for schoolboys. Many people still so regard it. It is one of the most nourishing foods on earth. It is estimated that the American crops are worth over £15,000,000 per annum. Farmers there are now putting thousands of acres into peanut cultivation. One man who could only clear a profit of £3 12s. per acre out of cotton, clears £13 5s. out of peanuts. Every part of the peanut is utilised according to Mr. Judson D. Stuart, who has just visited the peanut belt.

In the old days growers dug up the peanuts, picked them off the shoots—peanuts do not grow on the roots but on shoots which bloom and then dive into the ground to bear peanuts—put them in bags and sold them, and that was all.

To-day they use the tops for hay. Peanut hay is nourishing. It is easily cured, cattle like it, and thrive on it, and there is about £5 worth of peanut hay to the acre, sometimes more.

The peanut is of the same family as peas, beans, and other leguminous plants. It gathers nitrogen from the air, and deposits it on the roots in nodules. Whenever it is possible to plough the roots back into the ground they supply sufficient fertiliser. Some cut the hay and then plough the peanuts out, have them hand picked, and then plough the roots back into the ground, but this is not the quickest or most economical way. The customary method is to pull the entire plants, stack them on poles to dry the peanuts, then have the peanuts picked and the tops made into hay.

The peanut itself is full of money. The shells are not used for certain kinds of flaky breakfast foods, as has been said. They are ground into fine, velvety-white powder and sold to tin plate makers. There are but two things that will polish tin plate without scratching, middlings and peanut-shell powder, and middlings are now too expensive. Peanut oil is the most nourishing oil in existence, far better than cotton seed oil. It is used largely in place of olive oil.

The peanuts to be sold in the shell are put in drums, sometimes with a little marble dust, but not always, and whirled until the shells are smooth and white. Other peanuts are shelled and put into bags. These are for salted peanuts and also for peanut butter.

The cakes left after the oil is extracted make the highest-grade fodder for cattle. The United States Government is just now experimenting with peanut bread. The peanut butter is more nutritious than dairy butter, and excellent butter is made of peanut oil, a form of butter that no one can object to, as it contains no animal fat.

Even the boys are making gold out of peanuts. The U.S.A. Government has sent agents and instructors among them and organised clubs. These peanut clubs are teaching the boys how to beat their fathers at peanut growing, and it is not at all uncommon for twelve-year-old boys to rent an acre from their fathers, plant it with peanuts, and make a profit of £20.—“Popular Science Siftings.”

Apiculture.

THE AMERICAN BEE JOURNAL.

PRACTICAL QUEEN REARING.

The history of bee-keeping in Queensland dates back as far as 1860 and probably earlier, as bees were first introduced into New South Wales in 1822 by Captain Wallis, of the ship "Isabella." How they found their way to Queensland is not clear, but the writer's own experience is that in 1862 most of the pioneer farmers of Queensland kept bees—kept them in empty gin cases, candle boxes, and in other primitive contrivances. Bees, in those days, were found in hundreds of trees in forest and scrub. There were no scientific appliances for extracting the honey. Much was obtained by allowing the comb to drip, and the balance was saved by squeezing the comb in mosquito net. But, as happens in all new industries, improvements soon began. The gin case gave place to the Langstroth hive, uncapping devices, foundation comb, honey extractors, &c. About the year 1880 the Italian bees were introduced by Mr. Charles Fullwood, the race of black bees having been almost exterminated in Queensland by the bee-moth. From that time the industry took a new lease of life. There are few places on this earth more favourable for beekeeping than Australia, and Queensland in particular, and this, in itself, constitutes one of the difficulties of the beekeeper. In most parts of the State there is an abundance and a variety of honey-yielding flowers, chiefly on scrub and forest trees, and the climate could hardly anywhere be more suitable to the life and well-being of the honey bee.

Not only are the bees here able to gather honey and pollen during the whole year, but, in exceptional seasons, to even store some surplus honey during the winter months. With the introduction of more scientific methods than those of yore, bee-keeping in Queensland made great advances. What, however, is greatly to be desired is some good literature on the various phases of apiculture as adapted to Queensland conditions, such a book, for instance, as one lately issued by Frank C. Pellett, associate editor of the "American Bee Journal," Hamilton, Illinois. This very interesting and valuable publication is entitled "Practical Queen Rearing." Mr. Pellett, former State Apiarist of Iowa, is the author of several books, articles, &c., which, like that under notice, contain a fund of practical information and instruction on the subject of apiculture, of which he must have made a life study. He travelled far and wide in the United States to ascertain all the best methods of practice in use in the various apiaries of the Northern and Southern States, and has embodied in this work an exhaustive history of honey bees, their different races, their life history, their improvement by breeding, the equipment needed for queen-rearing, &c. As he rightly says, he has thought it well to make all his descriptions brief and to the point, eliminating all matter not of practical value. Other works, such as those of Doolittle, Alley, Sladen, and other well-known practical apiarists, have been freely consulted, and the book is profusely illustrated, most of the illustrations having appeared in conjunction with the many articles from the author's able pen which have appeared from time to time in the "American Bee Journal." We think we shall be borne out by our practical bee masters in this State when we express the opinion that such a valuable publication as "Practical Queen Rearing," is one that should find a place on the bookshelves of all apiarists. It may be obtained from the proprietors of the "American Bee Journal," Hamilton, Illinois, U.S.A. The price, inclusive of one year's subscription to that journal, is 1 dollar 75 cents.

Entomology.

REPORT UPON CANE GRUB INVESTIGATIONS AND OTHER PESTS

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon cane grub investigations and other pests from the Entomologist, J. F. Illingworth:—

During the month we have done considerable travelling, and by consultation with numerous leaders of the industry, in the various districts visited, we have been able to increase materially our knowledge of the habits of the various pests of sugar-cane.

Incidentally Mr. Girault and I have been devoting considerable time to the introduction of the tachinid parasites of the beetle borer (*Ceromasia sphenophori*) in infested districts. It will be recalled from former reports that these parasites had already been liberated at Moolaba, Babinda, and on the Mulgrave. During the past month we have secured fresh colonies and liberated these on the Johnstone and the Herbert. Those of the first locality were placed on the farm of Mr. R. Davis at Daraji; while on the Herbert they were placed at two points—Mr. Comba's farm, about 25 miles upstream, and in the mill nursery at Macknade.

INVESTIGATIONS AT MOSSMAN.

On all of our previous visits to Mossman, we had secured our supply of the parasites from the mill nursery, hence I was considerably disturbed to learn that this paddock had been burnt and milled, precluding all hope of securing further supplies there. A careful search of the district demonstrated that the beetle borers were scarcely in evidence anywhere; but, wherever found, there were unmistakable signs that the parasites were with them and that they were completely under control. On one farm I found these indications of the flies fully 15 miles from the mill nursery where they were liberated in 1910; and, what was most remarkable, there were several miles of forest country between these two points, with no sugar-cane. Evidently the flies have travelled up the country with the wind.

Upon the advice of Mr. C. J. Crees, the mill manager, we were able to locate a few borers on the farm of the Crees Bros. The pest had evidently come from a pile of discarded cane which had been dumped alongside the field when planting, for only a small semi-circular area in the field, opposite this rubbish, was affected. It was also very noticeable that most of the infested stools were rat-eaten, and the indication was that the rats had been digging out and feeding on the borer-grubs. Fortunately, most of the grubs that we were able to find in this spot were fully parasitised—the best material that I have ever seen. The benefited regions, where we are placing the parasites, certainly owe much to the public spirit of the Mossman Mill management, and to the public spirit of the above gentlemen, for assisting us in cutting up their crop to secure the parasites without recompense.

We sometimes hear criticism of the cultivation at Mossman, and it has been said that of the three kinds—extensive, intensive, and pretensive—theirs consisted largely of the latter. This is hardly just to the district, for the remark would never be made by one familiar with conditions there. Most of the Mossman soils are of a type very difficult to work under the climatic conditions. Consisting largely of clay, as most of them do, it is necessary to work them when the moisture content is just right; and since they are usually either too dry, or too wet, it is a difficult matter to turn them up without lumping. As is well recognised among the most experienced growers of the district, the abundant application of green crops will do much to alleviate this condition and put the soil in better tilth—even without the application of lime, which is now at a prohibitive price.

The rat pest, on some farms, is coming largely under control by clearing out weedy headlands and other areas bordering the cane fields. This is done in some cases by fencing close to the cane along streams and so forth, so that stock can be turned in to assist in keeping the waste places clean. It is an excellent idea, and if carried out generally, would do much to put the rats out of business. It certainly offers every facility for their natural enemies to get at them.

As indicated above, I took advantage of the occasion to try to learn what factors were responsible for the control of white grubs in the district. It will be remembered that this section was once badly affected.

Upon looking up the records at the mill, I found that after they started crushing in 1897, they paid out the following amounts for beetles and grubs collected:—1898, £16; 1899, £16; 1900, £88; 1901, £288; 1902, £656; 1903, £456; 1904, £548; 1905, £1,560 (the last year of the kanakas); 1906, £357.

During 1906 the growers decided to try out the use of carbon bisulphide, which had been recommended by French, the Victorian entomologist, for the control of the grubs, hence they discontinued payments for collecting the pest, and it was never resumed. However, as Mr. Harry B. Staples, who was mill chemist at the time, states in his report dated 16th August, 1910, the carbon bisulphide was not always satisfactory and never came into general use.

I was very much interested to learn, from the many interviews with growers, that the factors which we have been advocating are, evidently, the ones that have gotten the grubs under control at Mossman. These are, late planting and cultivation, resistant varieties, nitrogenous fertilisers, and the application of green manuring or other organic matter.

I learned from Mr. George Muntz, chairman of the board of directors of the mill, and one of the oldest growers of the district, that about the year 1906 there was a general change from early to late planting, and that this latter has been the practice up to the present time. He said that even after the mill ceased collecting grubs and beetles, as indicated above, this pest gradually became less and less in the district. Naturally, he concludes that late planting and cultivation is the explanation.

Mr. E. D. Hunt, an American, though a recent arrival, is making a success on a farm which was, up to the time that he took it, thoroughly infested with grubs. The soil is a sandy loam, lying along the river bank, hence is subject to occasional overflow. Late in 1915, Mr. Hunt planted a few acres of cane and treated it during November-December with about a bag (160 lb.) of sulphate of ammonia to the acre. He grows principally D 1135; and had continued the application of this fertiliser to all of his crop, with the result that he has never suffered from grubs, though feeding trees are abundant along the stream bordering his farm.

The farm of the late J. D. Johnson is another estate that was once badly infested. Mr. Johnson tried every possible remedy and was a great experimenter, but he had little or no success until he changed to D 1135 and late planting. His losses from grubs were immediately greatly reduced. There is little evidence on the place now of the presence of grubs.

Mr. R. A. Donnelly, another director of the mill and a grower of long experience, told me that he had no trouble from grubs for about five years after clearing his land from the scrub; but as the soil became poor the pest became evident and did great damage in places—as many as twenty-six grubs under a single stool of cane. He considers D 1135 very resistant and says that it will ratoon and make a very satisfactory crop after being attacked, while other canes die out so as to be worthless. He also considers late planting and cultivation very important as controlling factors, and called my attention to the success of these on the adjoining estate, which is known as the Syndicate. This place, though badly infested, was cleared of the pest by late planting and thorough cultivation.

Mr. J. M. Pringle, on a rather large estate of clay loam soil, also believes in late planting and the application of green crops to improve the tilth. Grubs have not been bad since D 1135 was planted in 1910. He once tried an experiment of planting B 147 alongside D 1135 and it was all destroyed by the grubs, while they did no noticeable damage to the latter variety. He uses meatworks manure on first ratoons and nitrates on later crops, with good success.

Mr. Pringle also told me that Mr. Low, on the adjoining farm, formerly greatly troubled by grubs, got good results from late planting and thorough cultivation. He said the soil was too wet for early planting (before May)

Mr. W. S. Johnson, who is managing Drumsara for S. Johnson, senr., began farming in the district in 1908. He informed me that late planting was the general practice at that time. D 1135 was beginning to be used. He planted misses in a field of Goru with this variety and all the Goru was eaten out by the grubs, leaving the D 1135 apparently uninjured. Hence, he considers the latter very resistant to grubs.

Evidence dealing more particularly with the value of sulphate of ammonia as a controlling factor was supplied by a number of growers in addition to those already referred to above.

The extensive estate of the late R. O. Jones was subject to serious losses from the grubs during the early years of the mill. He stated before the Royal Commission (6th November, 1911) that he cultivated 450 acres of cane in 1905 and lost 250 acres completely through grubs—fully £5,000 worth. At that time, just before he died, he said: "No human intelligence, so far, can contend with the grubs' depredations, and I do not think anybody has studied the subject more than I have." The estate was broken up into smaller farms and the sons took charge in 1911. They began the general use of sulphate of ammonia in November of that year, and planted part of the land to Mauritius beans. The cane crop was planted early, but in spite of that it did not suffer from grubs, and from that time they have had no further trouble. Mr. W. P. Jones told me that all the surrounding farmers used sulphate of ammonia persistently and that he considers it the active agent in the control of the grubs.

The farm of Crees Bros., a light sandy soil along the river bank, was once badly affected by grubs. The former owner applied large quantities of carbon bisulphide with little apparent result. However, after changing from meatworks manure to sulphate of ammonia, a few years ago, the grubs left and there has been no sign of them since.

Mr. H. H. Smith, who has been growing cane in the district for the past twelve years, told me that his fields were formerly eaten out by grubs but not seriously since he began the use of sulphate of ammonia. He plants early and applies about 3 cwt. of the ammonia to the acre in two dressings, during December and January. On one occasion he left a few rows untreated in a field of Goru, and these suffered badly from grubs. Naturally, he is a firm believer in the application of this manure.

Mr. Donnelly also experimented with sulphate of ammonia, by digging up the stools after it had been applied. He found the grubs limp and inactive, though in no case dead.

As an instance of a farm which has had no sulphate of ammonia, I visited the place of Mr. W. Bunn, at Cassowary. The soil is heavy clay loam and sticks to the plough when wet. Mr. Bunn told me he had no trouble from grubs for several years after clearing the land, but for a number of years now they have been always in evidence. He has used meatworks manure alone; and he told me that he found many large grubs under the stools when they were blown out by the recent cyclone.

I submit this evidence, for it appears to me that it may be far-reaching in controlling the pest in other districts. At any rate, the practice of these better cultural methods has its principal value outside of their relation to grub-control.

HERBERT RIVER DISTRICT.

The principal cane-growing areas lying along the river have ideal soil to work; but I was surprised to find the fields in such a weedy condition. The great drawback, as I learned later, is the labour market during the cutting season, the men

demanding up to 30s. a day for chipping. Meatworks is practically the only manure in general use; though sulphate of ammonia has given excellent results wherever tried. Furthermore, there has been no general practice of green-manuring in recent years; and I was also surprised to learn that the growers do not recognise the value of the mill compost, for hundreds of tons of this valuable manure is piled up in ricks and has been leaching away for years—the present supply is being used for ordinary filling of mud-holes and the ashes for surfacing the roads. If put up in bags this product should command a considerable market value.

As is well known, this district was once subject to serious injury from grubs; and, since the pest has largely disappeared in recent years, I was interested in investigating the matter.

There seems to be a definite relation of grub-infestation on the Herbert to feeding trees, for the areas which were infested in the early days are now free, while the farms that suffer at present are the outlying ones, bordering the scrub and forest—especially in proximity to the hills, which are covered with timber.

The management at Macknade gave me every possible assistance and kindly furnished me itemised figures of the beetles collected in their district during the past twenty years, with the amount of cash expended. These figures show that decidedly the worst infestation was from 1897 to 1901; then, from 1902 to 1915 the numbers were greatly reduced, and after the latter date, which was the year of the drought, the pest practically disappeared, except on the farms most distant from the mills.

It may be interesting to note that during the above period the mill paid out £11,272 17s. 10d. for 334,022 quarts of beetles, without any noticeable decrease in the pest from year to year. The marked reduction after 1915 was evidently due to natural causes, and was probably in no way connected with the hand-picking.

Very little cane in this district is burned before cutting—last season only about 5,000 out of 130,000 tons; but the trash is largely burned afterwards, so that it is not conserved for humus. It appears to be the general custom to take off only one ratoon crop and to plough this out and plant cane again immediately.

The burning of trash has evidently had a deterrent effect upon the beetle borers, for they are by no means a serious pest in the district. Even on the farm of Mr. Comba, near Hawkin's Creek, most of the grubs were right down in the butts, and it was very hard to discover any of the damage without first cutting cane.

Mr. W. Walker, who has been connected with the industry for the past forty years at Macknade, gave me a number of his interesting observations.

In the days of the kanakas, he said, the trash was removed to every third row and he found that grubs were always in these trash rows and the cane of these rows suffered during dry weather. This may evidently be explained in that the grubs, which naturally develop under trash, are forced down into the soil by drought and are then compelled to feed upon the cane roots.

At another time, Mr. Walker observed that the beetles were attracted to the lights of the quarters, and later on, when the grubs began to do damage, it was worst in the cane bordering these buildings—the beetles evidently going back from the light to the cane to lay their eggs. He also noticed that the beetles went with the wind from a fig-tree which stood in the field, and the cane was usually considerably more infested on that side.

Regarding the beetle borer, Mr. Walker informed me that they were first seen nine years ago, and that they must have come from plants received from New Guinea. The moth borer, however, which is a native insect, he said, was very troublesome as far back as 1889. This insect, which is well controlled by parasites, has done little injury in the district in recent years.

Mr. W. Authur, who is considered one of the best agriculturists of the district, once suffered severely from grubs, but not for the last five or six years. He uses

green-crops which he ploughs in preparatory to early planting. His soil is clay-loam and rather heavy, but he keeps it in good tilth by conserving his trash—none is burned. The single crop of ratoons is volunteered, and the double trash worked into the soil with a green-crop before planting another series of cane. He cultivates the plant-crop well, and applies about 5 cwt. of meatworks to the acre. It is his intention to use sulphate of ammonia on his ratoons during December, if it can be procured. I noticed that his headlands and fence-rows were clean—a factor important in the control of rats and other vermin.

Evidently the immunity from losses by grubs on this farm is due to the cultural methods, for the owner supplies the required humus and ploughs at a season when the beetles are depositing their eggs—December to February.

DESTRUCTION OF TACHINID PARASITES AT THE MULGRAVE.

I regret being compelled to report that our colony of tachinid parasites of the beetle borer was destroyed through the lack of co-operation on the part of the farmer on whose place the breeding-cage was located.

The understanding was that the borer-infested field was not to be cut until the end of the season and the part just around the cage was not to be burned.

I was considerably disturbed to find, on 10th October, when I made a visit to the cage, after my return from the Herbert River, that the whole field had been burned and cut, and the cage had been dumped out and torn up in moving it into the adjoining field of young plant cane.

Mr. Girault and I not only made two trips to Mossman to get this work started, but we have also had to make frequent journeys out to this farm, so that the parasites would have every opportunity to become established.

It is certainly discouraging to find that they now have no chance. The flies that we liberated, having reproduced, are dead, and the offspring are destroyed in the burn and the milling—it is only by a miracle, if any get away.

I have not been able to see the farmer in charge of the place, for he was away from home; but the matter was reported to the management of the Mulgrave Central Mill, since they were so urgent that we co-operate in the matter of establishing these parasites in the district.

THE LANTANA SEED-FLY.

I was interested to note the remarkable distribution of the Lantana Seed-fly. It has apparently spread all up and down the coast, since its liberation in the Cairns district in February, 1917. I found them well established at Mossman and even as far south as the Herbert River—where they were found all over the district. It is certainly remarkable that so small a fly could cross the natural barriers between the above districts, for there must be considerable stretches with no lantana for them to feed upon.

These insects are doing excellent work wherever established. The eggs are laid in the flowers and the infestation is noticeable even on the green fruit, for it becomes discoloured with brown streaks, and usually withers and falls before becoming ripe. In practically every case, the kernel of the seed is destroyed, so that it will not germinate. This in no way affects the parent plants, however, and they will live on for years if not cut out. I would strongly urge that everyone lend a hand in destroying this weed, if it is found on his premises, now that nature is stopping the spread.

Note by General Superintendent.—With reference to the expressed opinion as to the resistant powers of the variety of cane known as D 1135 to the attacks of grubs, it may be pointed out that this cane is not resistant to grubs in Southern Queensland.

MOSQUITO DESTRUCTION.

We are obliged to Mr. W. R. Colledge, Brisbane Associated Friendly Societies' Dispensary, for the following very interesting paper on this subject, which appeared in the "Comptes Rendus," Hebdom. Sc. Acad. Sc. Paris, and translated by Mr. Considine. It refers to a method of mosquito destruction which might be usefully followed by suburban gardeners and small farmers in many parts of Queensland, and we draw attention to it, as mosquitoes are now beginning to be troublesome. The article is entitled: "Parasitology.—A new method of destroying mosquitoes by alternating their breeding places, by MM. Edom et Sergeant."

Under Mediterranean climatic conditions, the average length of the life of mosquito larvæ in water till metamorphosed into the perfect winged insect is about three weeks (sixteen to twenty-five days).

We suggest the name "mosquito-breeding places" (gîtes) for the accumulations of water favourable for the reproduction of these insects.

These breeding places are sometimes of considerable size; such as lakes, pools, inaccessible marshes, and large streams. Only the labour of the engineer, that transforms the face of the land, suffices to deal with these large breeding places.

But sometimes breeding places of very limited size cause infestation of a whole region.

In a number of villages the maintenance of malarial mosquito breeding-places is freely kept up by water flowing from small springs, fountains, small reservoirs, washing pools, and irrigation canals. Trickling streamlets grow and widen out to form pools, in which the water is constantly changed without any strong flow, and which form excellent breeding-places for the anophelines.

Since commencing our first anti-malarial campaign in 1902, this type of breeding-place has been dealt with by the recognised anti-larval measures, such as replacement by masonry and concrete, cleansing, maintenance of repairs, mowing of herbage, application of kerosene, filling in of cattle hoof tracks, control of waterways, and efficient drainage.

For the last ten years we have experimented with success with a new and simpler method of procedure, in the Tell region of Algiers.

It frequently happens that the breeding-place is on the course of a single stream. On this we dig two channels, which, each for a week in turn, carry all the water. The water is turned into either channel at will by a simple earth dam or a water gate.

Each channel in turn during its week of use becomes the breeding-place of egg-laying anophelines and hatching larvæ. Then comes a dry week without water, when the channel is dried by the heat of the weather and the larvæ perish.

Each channel is alternately wet and dry for a week at a time, all the labour required being a few strokes of a mattock to break the one dam and rebuild it in the other channel, or double water gates may be used with advantage.

The arrangement may be varied. Instead of digging two channels, the water may be spread to the right or left by a series of secondary dams, in such a way that it may be absorbed by the ground or evaporated off within eight days. The water is not turned onto the same ground for some weeks. In this method little earth dams are used.

The method of drying off the breeding-places gives excellent results with but very little attention, and expense is considerably reduced. At a very moderate estimate, costs are reduced to a tenth of those of the usual anti-larval methods.

Summary.—A mosquito breeding-place of a permanent character is not necessarily dangerous. The remedy lies in substituting two alternating ones for the single permanent one.

In the Mediterranean region, mosquito larvæ require a breeding-place to be permanent for about three weeks. If this period is broken, so that each portion is alternately wet and dry for a week at a time, the larvæ cannot survive.

Science.

Snake-Bites and Their Treatment.

We have received several letters from subscribers and others, asking for the best cure for snake-bite, and as the reptiles are now beginning to be more numerous as the summer weather advances, we republish an article on the subject of snakes and the remedies for their bites which appeared in this Journal in March, 1911. In a most interesting pamphlet on "The Venoms of Australian Snakes" (1906), Dr. F. Tidswell, M.B., shows that in 87 cases of black snake bites, no deaths resulted. The tiger snake was responsible for 15 deaths out of 33 cases; the brown snake, for 15 out of 32; and the death adder for 5 out of 10 cases. Arranged in order of lethality, the death adder appears as the most lethal snake (50 per cent. of deaths); but close to it comes the tiger snake (45.5 per cent. of deaths); next, but far below, comes the brown snake (fatality, 18.7 per cent.); and, lastly, comes the black snake, to which *no fatality is attached*.

A correspondent has written suggesting that, in the interests of miners, some information should be given in the journal concerning snake-bites and the best known methods of treating them. It is an undoubted fact that men engaged in mining and in prospecting run great risk from snakes, both on the surface and in abandoned shafts, which often have to be reopened; and, as such men are generally far removed from medical aid, it is well that they should know the best thing to do when anyone is bitten, and that the means to be adopted should be as clearly and widely made known as possible. Unfortunately, as far as internal remedies are concerned, investigations by competent authorities go to prove, as will be more fully explained later on, that to be armed with a reliable antidote is not nearly such a simple matter as the correspondent mentioned seems to think. He has been informed that the poison of the death adder acts on the nerves, while that of the black, brown, and other venomous snakes acts on the blood; and suggests that the miner be made familiar with a specific for each class of bite of such a nature that he could be provided with it, and ready for any emergency. Dr. A. Muller, however, in his work on "Snake Poison: Its Action and Its Antidote," came to the conclusion, after full investigation and experiment, that all snake venom is a nerve poison; but Professor Martin, who, when in Australia, also made a study of the subject, seems to draw some distinction, inasmuch as he refers to the futility of the generally accepted remedies to prevent the clotting of blood caused by all Australian snake poisons except that of the death adder. Dr. Muller advocated the strychnine cure as a remedy in all cases of snake-bite; but, as he admits that it may be necessary at some stage of the treatment to administer strychnine in doses which, in the absence of the snake poison, would be fatal, it will be seen how dangerous it might be to try such a remedy without professional aid, even if later investigations had not considerably discredited—as indeed they have—this form of remedy. As to having the right antidote available, it is true that anti-venomous serum has been mentioned in this connection, but, as one must apply the right antidote to the right snake, this remedy is hardly practical under ordinary conditions.

HOW TO DISTINGUISH NON-VENOMOUS FROM VENOMOUS SNAKES.

In cases of snake-bite, it is, of course, very important to determine whether the reptile inflicting the injury is venomous or not. Many persons have undergone much pain and often risk from heroic treatment for bites which they have supposed to be those of venomous snakes, but which a knowledge of the external characters of the different species would have shown to have been perfectly harmless. Indeed, it is believed that not a few persons bitten by harmless snakes have been killed either by fright or the treatment to which they have been subjected; while many records of recovery under certain treatment are unreliable on account of the doubt existing as to whether the reptiles inflicting the bites were really venomous. A case occurred in New Guinea (Papua) a few years ago. A member of an exploring party was bitten by what appeared to be a black snake. The man was treated with various remedies, but soon died. The snake was sent to Brisbane and proved to be perfectly harmless. The man simply died of fright or injudicious remedies.

As a matter of fact, far more of the Australian snakes are non-venomous than is generally supposed. The late Dr. Krefft, for many years Curator of the Australian Museum, Sydney, and a recognised authority on Australian snakes, describes twenty-one innocuous and forty-two venomous snakes of this country; but of the latter, he says, not more than five species are dangerous to man or the larger animals,

and these retire underground for nearly five months of the year. The four Queensland snakes which are mostly to be dreaded are the death adder, the black snake, the brown snake, and the tiger snake. To the miner, prospector, and ordinary bushman, many opportunities are afforded of examining dead snakes; and, with a little observation and study, he might soon be able to tell at a glance the poisonous from the harmless species.

In the first place, on opening the mouth of a non-venomous snake, a row of small teeth will be seen along each jaw, and when such a snake bites he leaves two

rows of small punctures, thus—

In the venomous snake, these small teeth

are rudimentary, and leave no marks; but towards the outer edge of the upper jaw there are two fangs, and the punctures left by the bite from these are two in number, thus—. These fangs, which are the means by which the poison is conveyed from the snake to the person bitten, are not always in a state of projection, and it may be necessary to press the gum down with a stick or penknife before they can be seen; but this should be done with caution, and when it is certain the snake is dead. Sometimes, however, the punctures are not sufficiently distinct for them to be accepted as a reliable guide; but where the snake is seen there are other characteristics which will assist in the identification. According to Dr. Krefft, the gape of the mouth of the non-venomous Australian snake is usually curved upwards;

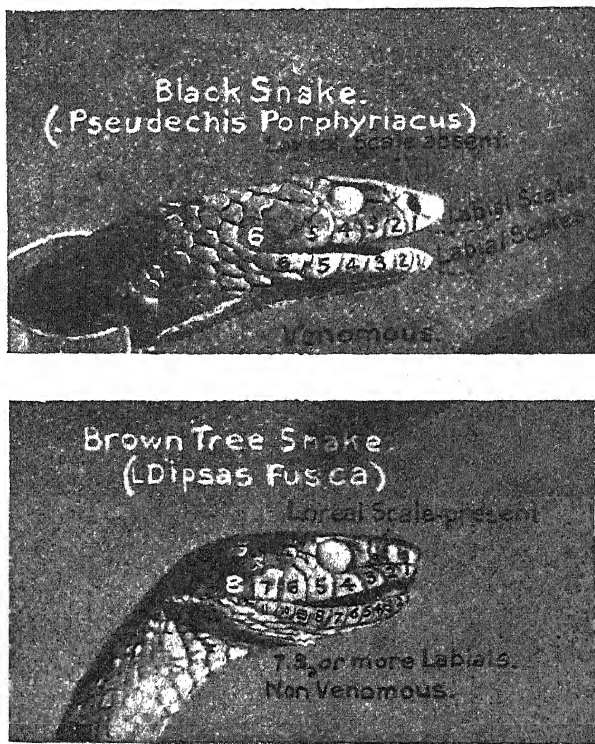


FIG. 1.—HEADS OF VENOMOUS AND NON-VENOMOUS SNAKES.

while in the venomous it forms a straight line. Again, an important distinction is to be found in the labial (lip) scales. Dr. Krefft says that of the labials there are seven or more in non-venomous snakes, while in the venomous "there are generally only six (we may say always six—never more)." He adds that "it may safely be asserted that by these shields alone can the harmless or venomous character of snakes be ascertained. This rule does not apply to sea snakes, nor to blind snakes of the family *Typhlopidae*, but to Australian venomous and innocuous colubrine snakes only." Another distinctive mark is that in the non-venomous snake

there is a loreal scale, which is absent in nearly all Australian snakes. This loreal scale is a supplementary scale which, in the non-venomous snake, is to be found on the cheek between a labial scale below and a frontal scale above, and between the ocular and nasal scales. In the venomous snake these four scales—the labial, frontal, ocular, and nasal—all unite at one point, and are not separated from each other, as in the harmless snake, by the loreal scale.

The head and mouth characteristics which distinguish the two classes of reptiles can be seen at a glance from the accompanying production of excellent photographs (Fig. 1) taken from *Nature* by the late Dr. John Thomson, of Brisbane, who was a keen student of this subject, and who kindly placed his pictures and other useful information readily at our disposal for the purposes of this article.

Dr. Thomson also had in his possession a diagram (in the shape of Fig. 2) showing, in such a way that "he who runs may read," the chief distinguishing features between the venomous and harmless snake. This diagram, which was originally prepared to illustrate a lecture, should be cut out, and kept by persons in the bush in some place where it may be readily and often seen, so that its points may become impressed on the mind.

TO DISTINGUISH VENOMOUS FROM NON-VENOMOUS SNAKES BY HEAD
CHARACTERISTICS (KREFFT).

<i>Venomous.</i>	<i>Non-venomous.</i>
GAPE OF MOUTH, STRAIGHT	GAPE OF MOUTH, CURVED UPWARDS
LABIAL SCALES, SIX	LABIAL SCALES, SEVEN OR MORE
LOREAL SCALES, ABSENT	LOREAL SCALES, PRESENT
BITE MARKS . . .	. . .
	BITE MARKS . . .
	. . .
	. . .

FIG. 2.

Dr. Krefft states that an Australian snake that is not thicker than a man's little finger, whatever may be its length, cannot by its bite endanger the life of an adult human being. It may be added that the true *freshwater* snake is always harmless, while the saltwater or sea snakes are always poisonous. Few of the tree snakes are venomous; while the carpet snake and the so-called "green snakes" are innocuous. Very often a thick woollen sock or stocking will prevent injury from the bite of a snake, as the fang may not penetrate sufficiently far for the poison which passes down its groove to be injected beneath the skin. There is a very widely accepted belief that the death adder inflicts injury by a *sting* from its tail, but this is not the case.

The general symptoms exhibited by persons bitten by a venomous snake are: Great anxiety, depression and prostration, feeble and intermitting pulse, profuse cold sweats, vomiting, hurried respiration, indistinct speech, dilation of the pupil of the eye, drowsiness, and finally, in fatal cases, unconsciousness and convulsions.

TREATMENT OF SNAKE-BITE.

Professor Martin, late of the Melbourne University, who some time ago was appointed Director of the Lister School of Preventive Medicine in London, before leaving Melbourne, delivered a lecture embodying the results of several years of research into Australian snake poisons. The results of his investigations are somewhat disappointing as far as the generally accepted remedies are concerned. He says that for all snakes except the death adder the only remedy that is of the slightest use is the ligature, applied immediately. He adds—

"If the bite be on the tip of the finger, the ligature may be tied round the base of the finger, if done instantly. If not, we must go higher. It is no use tying anything round the wrist or forearm, nor round the leg below the knee, for in these places the limb consists of two bones, and the circulation cannot be stopped by a band of any sort. We must go above the elbow or above the knee, where there is only a single bone. The ligature must be tied as tight as possible—twisted tight with a stick—for no blood must pass. In half an hour's time the ligature may be removed.

"All the usual remedies, such as ammonia, strychnine, and chloride of lime injections, whiskey, and exercise, are powerless to check the clotting of blood caused by all Australian snake poisons, except that of the death adder. Cutting out the piece and gashing the limb to make it bleed is equally futile. Anti-venomous serum is a remedy, but hardly a practical one, as you must apply the right antidote to the right snake."

Other authorities do not go so far as Professor Martin with regard to scarifying the wound and administering stimulants, and, so far as they are not likely to be injurious, these means will probably continue to be followed as extra precautions. Dr. J. Ashburton Thompson, when Chief Medical Officer of the Government Health Department of New South Wales, issued specific directions for snake-bite treatment. He first advises the use of the ligature, which is to be loosened for five minutes after the first half-hour; then tied and screwed up again. At the end of the second half-hour the ligature may be removed altogether. Dr. Thompson, in continuing his directions, says:—"In places where a ligature cannot be tied, as on the neck or face, pinch up the bitten part between the finger and thumb, and cut it out. In any case, the bitten part should be cut into by numerous little cuts over and around the bite, for about $1\frac{1}{2}$ inches round, and sucked by the mouth freely and perseveringly; and this can be done without danger by any person. Stimulants, such as brandy, whiskey, gin, rum, in small quantities at a time (a few teaspoonfuls), or strong tea or coffee or wine may be given if the patient be faint."

The removal of the ligature as described is a very necessary precaution, for at least one case has occurred in Queensland where, through keeping it on too long, mortification set in, and amputation of the arm had to be resorted to.

Professor Krefft, in his work previously referred to, says:—"The whole treatment resolves itself into this: *Suck the wound, if possible, at once; apply a ligature; lacerate the punctures, and wash the part with water or urine; keep moving, and do not despond.* Half the number of fatal cases have resulted from fear, many persons having died simply because they lost heart, did not attempt to tie a ligature, or were afraid to lacerate the wound and suck it."

A Croydon paper some time ago published particulars of a case in which a cure had been effected by rubbing vinegar into the wound; but in this case the ligature was first applied and the wound scarified. The vinegar was used in consequence of the person treating the patient having seen an extract in the "Queensland Agricultural Journal" from an Indian paper, which described experiments successfully made with it on animals which had been bitten by snakes.

The late Mr. John Wilson, Brisbane, said that in Ceylon he was very successful in saving the lives of coolies who were bitten by cobras or tie-polongas when picking coffee. As soon as a man was bitten, a ligature was put above the wound, then a pin was pushed through the skin, a piece of twine was twisted round the projecting part of the pin and drawn tight. This raised the bitten part, which was cut off with a sharp knife.

The vinegar cure is described in the "Queensland Agricultural Journal" in the issues of January, 1903, January, 1904, and February, 1905. Three authenticated cases of cure of snake-bite by the vinegar treatment have been reported to us since the first article appeared in the Journal.—Ed. "Q.A.J."

ANOTHER ARTICLE ON THE SAME SUBJECT DETAILS AN EASY METHOD OF PREVENTING DEATH FROM SNAKE-BITE.

For the next three or four months snakes of all kinds will be in full vigour and activity, and although deaths from snake-bite are rare in Queensland, still those whose business takes them into the neighbourhood of swamps will run the risk of unwarily treading on a black snake in the same way as the bushman whose work lies on dry ridgy land is liable to make acquaintance with a death adder. Queensland snakes are, as a rule, shy, and nearly always try to escape from man, but when suddenly molested they are apt to show fight, and a deadly stroke of the poison fang may endanger the life of a victim who is far from medical help. We therefore think that a timely publication of a paper under the above heading, by Sir Lauder Brunton, Sir J. Fayrer, and Dr. L. Rogers, which appeared in the Proceedings of the Royal Society (Eng.), Vol. 73, No. 494, p. 323, will be appreciated.

Following is an abstract of the paper:—

The treatment advocated in this paper is the net result of experiments made with the venoms of each main division of snakes, including especially that of the cobra. The Australian black and brown snakes belong to the same family as the Indian cobra, and the venoms of all these snakes, it may be parenthetically remarked, have the effect of clotting the blood of any person or animal bitten. The venom of death adders does not have this effect.

The experiments show that if cobra venom be mixed with a 1 per cent. solution of permanganate of potash the activity of the poison is destroyed and it becomes innocuous. Further, that if a solution of the permanganate be injected into the tissues close to the place where snake venom has been just previously injected, say within from one or two up to five or even ten minutes after the injection of the venom, either no symptoms of snake-poisoning occur or a fatal result is averted, and the poisonous effects are more or less mitigated.

The result varies according as the interval which elapses before the antidote is applied is longer or shorter, and is successful in the same measure as the permanganate is actually able to overtake the venom and mix with it before it has been absorbed by the system. *For whatever part of the venom is brought into actual contact with the permanganate is rendered inert and harmless*, whilst the antidote has no effect whatever on that part which has been actually absorbed into the system. It is therefore of no use taken internally, and of very problematic value if applied to or injected into the snake-bite after any considerable lapse of time, especially if no ligature has previously been applied to stop the circulation in the locality of the bite.

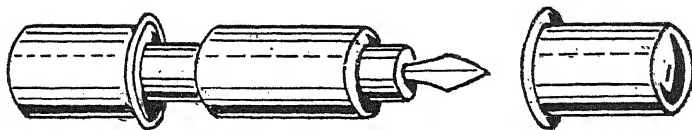
It is estimated that the solid permanganate of potash will neutralise its own weight of venom when directly mixed with it, either solid or in a solution; moreover, it acts on every class of venom, including that of death adders, &c.

Snake venom is cumulative in its action, which means that the ultimate effect is always that of the whole quantity of venom injected into the body and left undestroyed in the wound, and therefore certain to be eventually absorbed by the tissues; for the portion of venom first absorbed does not in any appreciable degree lose its effect as time goes on, nor is it quickly eliminated, but continues its poisonous action upon the system after the remainder of the venom becomes gradually absorbed and actively poisonous, and thus the effect increases or accumulates as the absorption progresses.

It has been estimated that the average amount of venom injected by a full-sized cobra is not more than what would equal 10 lethal doses for a man. Further, in many cases, the full dose will not actually be injected into the human tissues, for various reasons, such as the hindrance afforded by clothing, &c.

The plan now proposed is (after first ligaturing the limb by means of a strip of bandaging or other material tied loosely around it, and then twisted up tightly with a stick) to make a free opening into the site of the bite, deep enough to reach to the lowest point reached by the snake (half an inch should always be sufficient), and to rub in crystals of permanganate of potash. The punctures made by the fangs should be freely cut into, and the permanganate introduced and well rubbed round (being wetted with a few drops of water or even saliva), until the exposed tissues present a uniformly blackened appearance; or alternatively, a solution in water of the permanganate (made, say 1 in 10 in strength) could be used as a hypodermic injection into the punctures.

Sir L. Brunton has designed a suitable instrument for use, which can be carried in the pocket. It consists of a lancet-shaped blade, about half an inch long (long enough, in fact, to reach to the deepest point of a bite by the largest snake). This is set in a wooden handle, about $1\frac{1}{2}$ inches long, which is hollowed out at the other end so as to form a receptacle to hold the permanganate. Two wooden caps are fitted on the ends, one to protect the lancet, and the other to keep in the permanganate.



It is to be noted that this treatment is directed solely against the actual unabsorbed venom in the wound. The subsequent treatment, by strychnine, alcohol, or otherwise, of any symptoms of snake-poisoning which may arise is not interfered with.

N.B.—Never let it be forgotten to loosen the ligature for a few minutes half an hour or so after it has been put on, as otherwise gangrene of the limb may cause its loss, if no worse happens.

General Notes.

LIST OF SOCIETIES.

DALBY.—The Annual Show of the Dalby Pastoral and Agricultural Association will be held on 29th and 30th April, 1919.

The Show dates of the Eastern Downs Horticultural and Agricultural Association, Warwick, have been fixed for 11th to 13th February. The Dalby Pastoral and Agricultural Association will hold its Annual Show on 31st July and 1st August. 5th, 6th, and 7th February have been fixed for the Show of the Stanthorpe Agricultural Society.

A WEED DESTROYER.

Many garden paths, notwithstanding the late dry weather, are covered in parts with grass and weeds; consequently, a considerable amount of hoeing is necessary. These weeds can easily be destroyed by one or two methods. One is to make a strong solution of rock salt, the better if it can be obtained from salted hides. Watering the paths with this will effectually banish weeds. Another remedy is to dissolve 3 lb. of arsenate of soda in 12 gals. of water, and copiously water the paths. Care must be taken not to distribute the solution too near to grass or other edgings of flower beds. If a watering can is used for this purpose, it must be thoroughly cleansed with clean water before being used for watering plants.

AN EXPERIMENT IN VINE TOPPING.

Mr. E. H. Rainford, formerly Instructor in Viticulture to the Department of Agriculture, Queensland, deprecated in his writings on this subject the practice of indiscriminate topping of the vine which many vinegrowers indulge in, maintaining that it is decidedly disadvantageous instead of beneficial, and that it should only be practised when cultural operations render it necessary.

With a view to getting some fact to support the argument, he made an experiment on some vines, with the following result:—

In the middle of three rows of Mataro or Espar vines, at one of the State farms, twenty vines were topped to about 12 inches length above the last bunch of grapes, shortly after the berries had set and were the size of large shot. The topping was renewed twice when the laterals had made sufficient growth to allow it.

Result.—The bunches coloured at least a week later than those on the vines on either side, in some cases ten days later. When the grapes were picked, the grapes of the vines that had not been topped contained 20 per cent. of sugar, while those of the topped vines contained 16.5 per cent. of sugar, and there was decidedly less colouring matter in the skins. Had the grapes of the topped vines been allowed to hang for some time longer, they might have gained a little in sugar, but not much.

Surely this goes some way towards proving that excessive topping is hurtful, and not beneficial; but, as conclusions should never be drawn from a single experiment, other experiments were made with similar results.

This experiment has been well borne out by a previous experiment on Isabella vines. In this case, an amateur gardener pruned off all the tops of his vines, a foot or two above the fruit, of which there was a splendid show on the vines; but the result of topping, so far from benefitting the grapes, proved a positive injury.

In the succeeding season he left the vines severely alone, and, as a consequence, the vines, which in the previous season produced 3 cwt. of grapes irregularly ripened, yielded nearly double the quantity and the grapes ripened well together.

THE LUCE CANE HARVESTER.

It will be remembered that both at the Conference of sugar-growers convened by the Government, and at the council meetings of the Australian Sugar Producers' Association, reference has been made to the importance of securing definite information as to the adaptability of the Luce Cane Harvester to the necessities of the Queensland canegrower. We have never heard that this is a miller's question in any special sense; but it is a fact that the association has devoted much time and attention to the possibility of securing a thorough trial of the machine under Queensland conditions. Perhaps next time some of our opponents are casting around for proof of the one-sidedness of this organisation, they will not forget its work in connection with the Luce Harvester. But what they started out to deal with is an article in the "Louisiana Planter" of 31st August, giving a general review of the sugar situation in Queensland, basing its remarks on information evidently gleaned from the columns of "The Australian Sugar Journal." In this article, which is wholly of a friendly tone, there is a reference which will be read with interest here. The writer says:—

"The loss of the kanaka labour, and the making of Queensland a white man's country made the cutting of cane in the field alone cost over a dollar a ton. (How much more?—Editor.) It is suggested that the Government should buy a Luce Cane Harvester for its own account, taking it out to Queensland, and exploiting it there under Queensland conditions, which, of course, would be desirable, if not absolutely necessary, as all such machines must be adapted to any peculiarities of the conditions under which they are to work."

Drawing a parallel from experience in the use of rice harvesting machinery in Louisiana, the writer adds,—"Just such a line of reasoning is urged for the cane fields of Queensland, Australia, where labour is securing probably a higher reward for its services than is given anywhere else on earth, excepting (sic) perhaps it be in Louisiana."

The Australian Sugar Producers' Association has already set on foot inquiries from authoritative sources in Hawaii and in America, and it is hoped that useful information may shortly be available on which to base definite action towards the objects in view, namely, the actual trial of the machine in Queensland, should its record elsewhere justify further expense.—"Queensland Sugar Journal," 7th November.

THE SUGAR CROP ESTIMATE.

The General Superintendent of the Bureau of Sugar Experiment Stations (Mr. H. C. Easterby) states that he has now received the midseason's estimates of the tonnage of cane expected to be put through the rollers this season. If matters run smoothly it is anticipated that approximately 1,801,200 tons of cane will be crushed this year. Allowing 8½ tons of cane to 1 ton of sugar, then the tonnage of raw sugar to be manufactured in Queensland should be about 206,000. The Commonwealth consumption is now stated to be 283,000 tons, a large increase on the two previous years, but no doubt due to the export of sugar in jams. This would leave a deficiency of 77,000 tons. Assuming that New South Wales makes about 20,000 tons, this would still leave a shortage of some 57,000 tons. The present probabilities are that next year's shortage will be still greater.

USE OF MOLASSES FOR STOCK.

Considerable anxiety has been occasioned in some of the sugar districts, owing to the currency of a report that, under legislation recently introduced in the Queensland Assembly, farmers and others would no longer be able to procure molasses from the mills for the purposes of stock feeding. From inquiry, we are able to state that there is no truth in this report. The Stock Foods Bill, recently submitted to Parliament, and which, by the way, cannot be dealt with until next session, does not affect the sale of molasses as such. It deals only with "concentrated or prepared stock food," together with hay and chaff.—"Queensland Sugar Journal."

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR NOVEMBER, 1918.

Article.						OCTOBER.	
						Prices.	
Bacon	...	...	...	...	lb.	9d. to 10d.	
Barley	...	...	...	...	bush.	4s. 9d.	
Bran	...	...	...	...	ton	£4	
Broom Millet	...	...	...	...	"	£30 to £50	
Broom Millet (Sydney price)	...	...	...	...	"	£60	
Butter (First Grade)	...	...	...	...	cwt.	154s.	
Chaff, Mixed	...	...	...	...	ton	£9	
Chaff, Oaten	...	...	...	...	"	£9 to £10	
Chaff, Lucerne	...	...	...	...	"	£5 to £14	
Chaff, Wheaten	...	...	...	...	"	£6 10s. to £8	
Cheese	...	...	...	...	lb.	11½d.	
Flour	...	...	...	...	ton	£12	
Hams	...	...	...	...	lb.	1s. 6d. to 2s.	
Hay, Oaten	...	...	...	...	ton	...	
Hay, Lucerne	...	...	...	...	"	£8 to £10	
Hay, Wheaten	...	...	...	...	"	£9 5s.	
Honey	...	...	...	...	lb.	3½d. to 5d.	
Maize	...	...	...	...	bush.	5s. 11d. to 6s.	
Oats	...	...	...	...	"	3s.	
Onions	...	...	...	...	ton	£39	
Peanuts	...	...	...	...	lb.	9d. to 1s.	
Pollard	...	...	...	...	ton	£5 10s.	
Potatoes	...	...	...	...	"	£18 10s. to £19 10s.	
Potatoes (Sweet)	...	...	...	...	cwt.	5s. 3d. to 6s. 2d.	
Pumpkins (Cattle)	...	...	...	...	ton	£13 to £16	
Eggs	...	...	...	...	doz.	8½d. to 11d.	
Fowls	...	...	...	...	per pair	4s. to 8s.	
Ducks, English	...	...	...	...	"	4s. to 5s. 6d.	
Ducks, Muscovy	...	...	...	...	"	4s. to 7s. 6d.	
Geese	...	...	...	...	"	8s. to 10s.	
Turkeys (Hens)	...	...	...	...	"	5s. 6d. to 14s.	
Turkeys (Gobblers)	...	...	...	...	"	18s. to 27s. 6d.	
Wheat (Milling)	...	...	...	...	bush.	4s. 8d. to 4s. 10d.	

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen bundles	...	...	...	...	...	5s. to 12s.
Beans, per sugar-bag	...	...	...	...	...	10s. to 15s. 6d.
Beetroot, per dozen bundles	...	...	...	...	...	1s. to 2s.
Cabbages, per dozen	...	...	...	...	...	10s. to 15s.
Carrots, per dozen bunches	...	...	...	...	...	1s. to 1s. 6d.
Cucumbers, per dozen	...	...	...	...	...	1s. to 2s. 3d.
Lettuce, per dozen	...	...	...	...	...	1s. to 1s. 3d.
Marrows, per dozen	...	...	...	...	...	3s. to 7s. 6d.
Parsnips, per dozen bunches	...	...	...	...	...	1s. 6d. to 3s.
Peas, per sugar-bag	...	...	...	...	...	10s. to 15s.
Sweet Potatoes, per sugar-bag	...	...	...	...	...	1s. 6d. to 2s. 6d.
Tomatoes, per quarter-case	...	...	...	...	...	7s. to 10s.

SOUTHERN FRUIT MARKETS.

Article.	NOVEMBER.	
	Prices.	
Bananas (Queensland), per case	12s. to 15s.	
Bananas (Tweed River), per case	10s. to 15s.	
Bananas (Fiji), per bunch	10s. to 12s.	
Bananas (G.M.), per bunch	5s. to 6s. 6d.	
Bananas (G.M.), per case	22s.	
Cherries, per 12lb. box	24s.	
Lemons (Local), per bushel-case	4s. to 5s.	
Mandarins, per bushel-case	20s.	
Oranges (Navel), per case	24s.	
Oranges (Other), per case	5s. to 11s.	
Oranges (Queensland), per case ... ..	...
Papaw Apples, (Queensland), per case	12s.	
Passion Fruit, per bushel-case	30s.	
Pineapples (Queens), per double-case	10s. to 12s.	
Pineapples (Ripleys), per double-case	8s. to 9s.	
Pineapples (Common), per double-case	7s. to 8s.	
Tomatoes (Queensland), per half-case	2s. to 6s.	

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per case	13s. to 17s.
Apples, Cooking, per case	10s. to 14s.
Bananas (Cavendish), per dozen	2d. to 5d.
Bananas (Sugar), per dozen	2d. to 6d.
Cape Gooseberries, per quart	9d.
Cherries, per case	7s. to 20s.
Citrons, per hundredweight	16s.
Cocoanuts, per sack	15s. to 25s.
Custard Apples, per quarter-case ... ..	...
Lemons (Lisbon), per case	10s. to 15s.
Mandarins, per case ... ..	...
Mangoes, per case	6s. to 9s.
Oranges (Navel), per case ... ..	...
Oranges (Seville), per hundredweight	12s.
Oranges (Other), per case	12s. to 16s.
Papaw Apples, per half-bushel-case	1s. 6d. to 3s. 6d.
Passion Fruit, per quarter-case	8s. to 10s.
Peanuts, per lb.	9d. to 1s.
Pineapples (Ripley), per dozen	1s. 6d. to 6s.
Pineapples (Rough), per dozen	1s. 6d. to 6s.
Pineapples (Smooth), per dozen	1s. to 4s. 9d.
Strawberries, per dozen boxes	3s. to 9s.
Tomatoes, per quarter-case	7s. to 9s. 6d.

TOP PRICES, ENOGGERA YARDS, OCTOBER, 1918.

Animal.	OCTOBER.	
	Prices.	
Bullocks	£27 17s. 6d. to £33 15s.	
Cows	£17 12s. 6d. to £21	
Merino Wethers	42s. 6d.	
Crossbred Wethers	44s.	
Merino Ewes	34s.	
Crossbred Ewes	32s. 3d.	
Lambs	34s.	
Pigs (Bacon) ... ..	...
Pigs (Porkers)	38s. 6d.	

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF OCTOBER, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING OCTOBER, 1918 AND 1917, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Oct.	No. of Years' Records.	Oct., 1918.	Oct., 1917.		Oct.	No. of Years' Records.	Oct., 1918.	Oct., 1917.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton ...	0.94	17	0.25	4.17	Nambour ...	3.27	22	0.42	1.77
Cairns ...	2.08	36	0.15	7.21	Nanango ...	2.42	35	1.02	1.97
Cardwell ...	2.02	46	0.14	8.00	Rockhampton ...	1.86	31	0.01	1.53
Cooktown ...	1.17	42	Nil	1.30	Woodford ...	2.74	31	1.00	1.09
Herberton ...	0.94	31	0.20	1.19					
Ingham ...	1.55	26	1.24	1.95	<i>Darling Downs.</i>				
Innisfail ...	3.11	37	0.96	5.04	Dalby ...	2.15	48	1.51	1.22
Mossman ...	3.76	10	0.34	4.99	Emu Vale ...	2.46	...	1.06	2.72
Townsville ...	1.24	47	Nil	0.37	Jimbour ...	1.92	...	1.59	0.96
					Miles ...	2.05	33	0.88	2.78
<i>Central Coast.</i>					Stanthorpe ...	2.68	45	1.24	2.87
Ayr ...	0.93	31	0.02	0.32	Toowoomba ...	2.73	46	1.78	2.92
Bowen ...	1.08	47	Nil	0.54	Warwick ...	2.35	31	0.87	2.57
Charters Towers ...	0.69	36	0.06	0.70					
Mackay ...	1.93	47	Nil	0.91	<i>Maranoa.</i>				
Proserpine ...	1.89	15	0.52	1.02	Roma ...	1.76	44	1.11	1.39
St. Lawrence ...	1.91	47	0.15	3.13					
<i>South Coast.</i>					<i>State Farms, &c.</i>				
Biggenden ...	2.35	...	0.03	1.20	Bungewongorai ...	1.32	4	0.84	1.86
Bundaberg ...	2.20	35	0.04	2.39	Gatton College ...	2.42	...	0.68	1.21
Brisbane ...	2.68	67	1.14	1.58	Gindie ...	1.55	5	0.04	0.65
Childers ...	2.23	23	0.10	1.68	Hermitage ...	2.08	...	0.98	2.39
Crohamhurst ...	3.57	25	0.80	1.67	Kairi ...	1.38	4	...	3.35
Esk ...	2.46	31	0.92	2.86	Kamerunga ...	1.75	...	Closed	3.30
Gayndah ...	2.45	47	0.36	1.51	Sugar Experiment				
Gympie ...	2.77	48	0.99	0.56	Station, Mackay	1.85	...	Nil	0.82
Glasshouse M'tains	3.13	10	0.33	1.55	Warren ...	2.93	4	Nil	1.19
Kilkivan ...	2.76	39	0.21	0.56					
Maryborough ...	2.79	47	0.55	1.79					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for October this year, and for the same period of 1917, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6.3	5.34	5.29	5.47	4.59	6.5	4.46	6.28	PHASES OF THE MOON. The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania. H. M. 5 Sept. ☉ New Moon 8 44 p.m. 14 „ ☾ First Quarter 1 3 a.m. 20 „ ☉ Full Moon 11 1 p.m. 27 „ ☾ Last Quarter 2 39 p.m. The Moon will be farthest from the earth on the 8th, and nearest to it on the 21st. 5 Oct. ☉ New Moon 1 5 p.m. 13 „ ☾ First Quarter 3 0 p.m. 20 „ ☉ Full Moon 7 35 a.m. 27 „ ☾ Last Quarter 3 35 a.m. The Moon will be farthest from the earth on the 6th, and nearest to it on the 20th. 4 Nov. ☉ New Moon 7 2 a.m. 12 „ ☾ First Quarter 2 46 a.m. 18 „ ☉ Full Moon 5 33 p.m. 25 „ ☾ Last Quarter 8 25 p.m. The Moon will be farthest from the earth on the 2nd and 20th, and nearest on the 17th. 4 Dec. ☉ New Moon 1 19 a.m. 11 „ ☾ First Quarter 12 31 p.m. 18 „ ☉ Full Moon 5 18 a.m. 25 „ ☾ Last Quarter 4 31 p.m. The Moon will be nearest to the earth on the 15th, and farthest from it on the 27th. There will be an annular or ring-shaped Eclipse of the Sun on 3rd December, but it will not be visible in Australia.
2	6.2	5.34	5.27	5.47	4.58	6.5	4.46	6.28	
3	6.1	5.35	5.26	5.48	4.57	6.6	4.46	6.29	
4	6.0	5.35	5.25	5.48	4.56	6.7	4.46	6.30	
5	5.59	5.36	5.24	5.49	4.55	6.8	4.46	6.31	
6	5.58	5.36	5.22	5.50	4.54	6.9	4.46	6.32	
7	5.57	5.36	5.21	5.50	4.54	6.9	4.46	6.32	
8	5.56	5.37	5.20	5.51	4.53	6.10	4.46	6.33	
9	5.54	5.37	5.19	5.51	4.53	6.10	4.46	6.34	
10	5.53	5.38	5.18	5.52	4.52	6.11	4.47	6.35	
11	5.52	5.38	5.17	5.52	4.52	6.12	4.47	6.35	
12	5.51	5.39	5.16	5.52	4.51	6.13	4.47	6.36	
13	5.50	5.39	5.16	5.53	4.51	6.13	4.48	6.36	
14	5.49	5.40	5.15	5.53	4.50	6.14	4.48	6.37	
15	5.47	5.40	5.15	5.53	4.50	6.15	4.49	6.37	
16	5.46	5.41	5.14	5.54	4.49	6.16	4.49	6.38	
17	5.45	5.41	5.13	5.54	4.49	6.17	4.50	6.38	
18	5.44	5.41	5.12	5.55	4.48	6.17	4.50	6.39	
19	5.43	5.42	5.11	5.55	4.48	6.18	4.50	6.39	
20	5.42	5.42	5.10	5.56	4.48	6.19	4.51	6.40	
21	5.41	5.43	5.9	5.56	4.48	6.20	4.51	6.40	
22	5.40	5.43	5.8	5.57	4.47	6.21	4.52	6.41	
23	5.39	5.44	5.7	5.58	4.47	6.21	4.52	6.41	
24	5.37	5.44	5.7	5.58	4.47	6.22	4.53	6.42	
25	5.36	5.44	5.6	5.59	4.47	6.23	4.54	6.42	
26	5.35	5.45	5.5	5.59	4.46	6.24	4.54	6.43	
27	5.33	5.45	5.4	6.0	4.46	6.25	4.55	6.43	
28	5.32	5.46	5.3	6.1	4.46	6.25	4.55	6.44	
29	5.31	5.46	5.2	6.2	4.46	6.26	4.56	6.44	
30	5.30	5.46	5.1	6.3	4.46	6.27	4.56	6.45	
31	...	...	5.0	6.4	...	...	4.57	6.45	

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, and November may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night, when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Orchard Notes for January.

THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. baskets. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, as if the latter cannot get good fruit it is impossible for them to put a line of goods that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as if so they are apt to become fly-infested.

Watermelons and rock melons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit-fly, and gather and destroy all infested fruit, or, better still, grub the trees out and burn them as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

THE TROPICAL COAST DISTRICTS.

See that all bananas are covered with netting, as the fly is usually at its worst at this time of year.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district, apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, grade and pack

in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruit-fly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on any infected trees, as if kept in check during the month the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth; examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market, not before. If sent down green they will sell for cooking, and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red Scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.

Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole. Early-sown cotton will be in bloom.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw,

grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflower, mustard, cabbage, celery, radish for autumn and winter use. Sow celery in shallow well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower-beds gay and attractive during the autumn and winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost; then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle lift them gently one by one with a knife or a zinc label—*never pull them up by hand*, as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over-water at this season. Propagate verbenas, not forgetting to include the large scarlet Foxhunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed-boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work, the flower garden in autumn and winter will present a charming sight, and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on "Flower Gardening for Amateurs" has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.

Another useful publication is "Market Gardening in Queensland." Price, 1s, also issued by the Department.

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